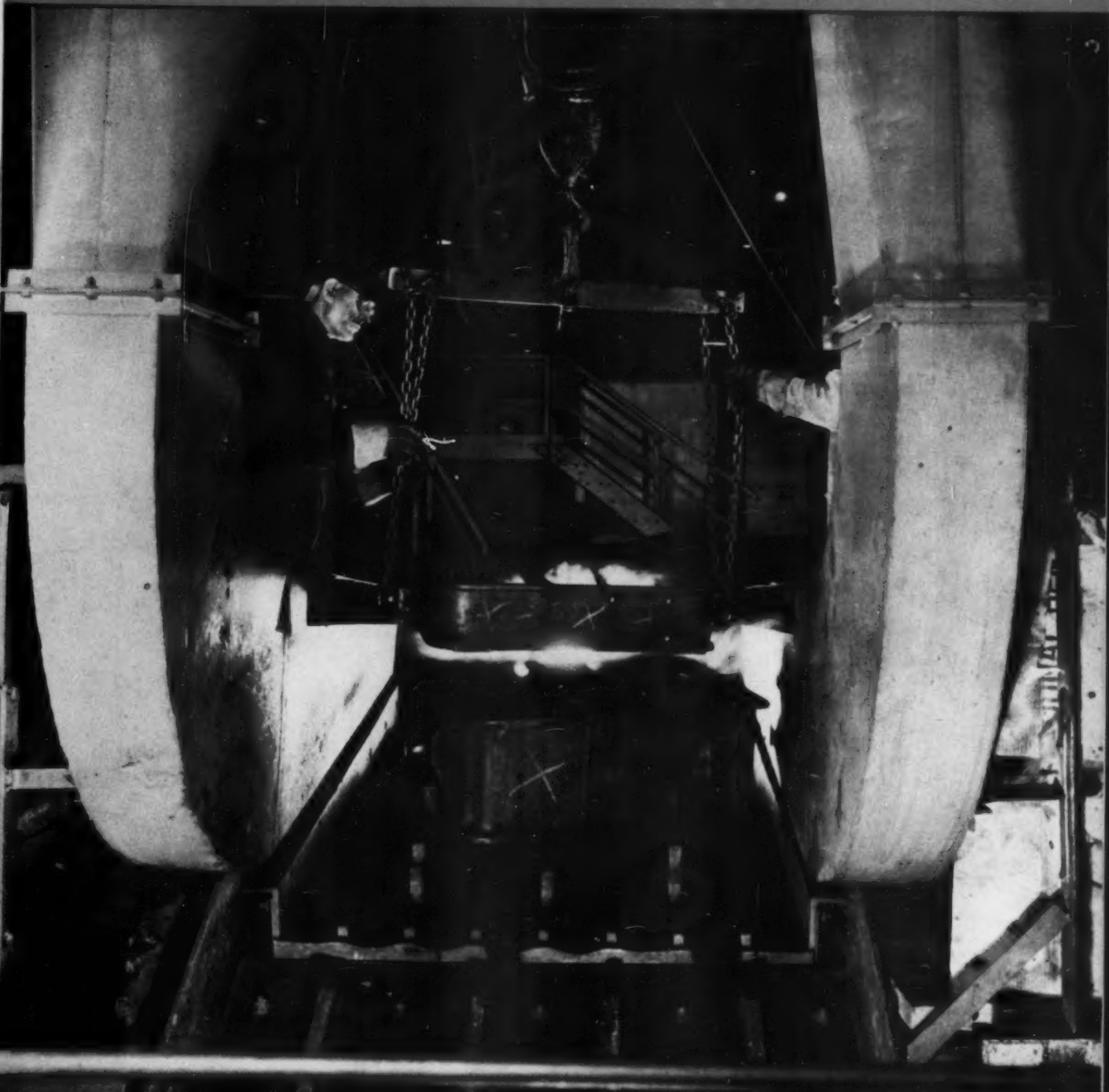
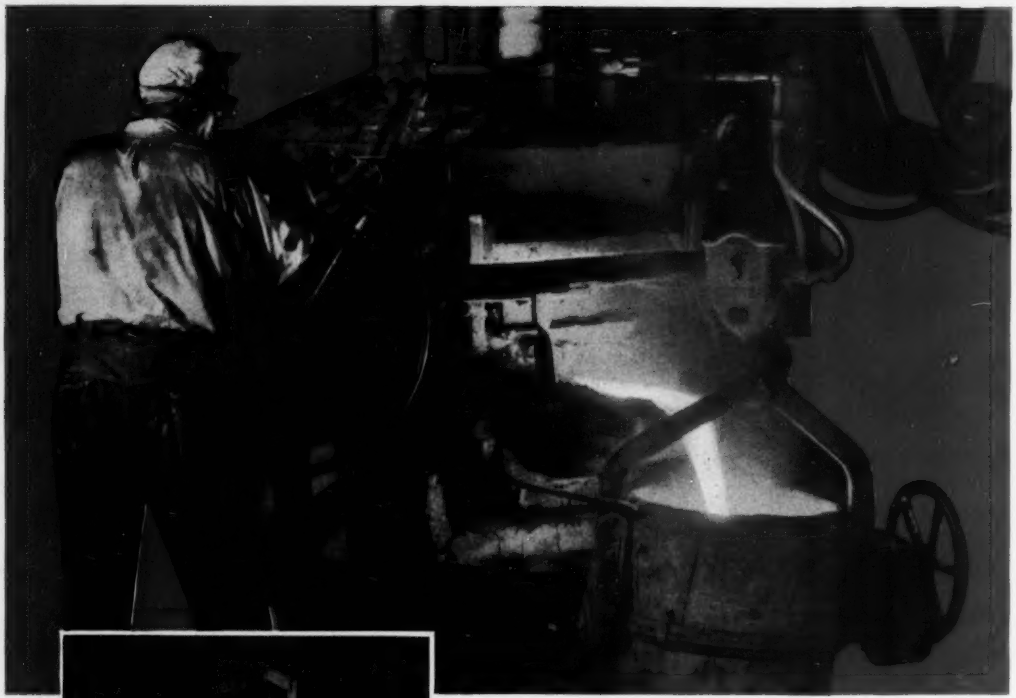
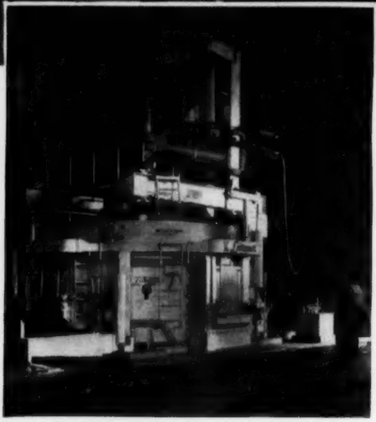
march 1952

THE FOUNDRYMEN'S OWN MAGAZINE

American Foundryman







Lectromelt Furnaces grow BIG, too.

Strong, sound irons for special castings are produced in this Lectromelt Furnace at Ferro Machine & Foundry Company, Cleveland.

Nicknamed "The Drugstore" because it fills prescriptions so accurately . . .

"With our electric-furnace duplexing process, we are able to produce special irons for a great variety of castings requiring heat and wear resistance and ability to withstand extreme pressure . . . and do it economically."

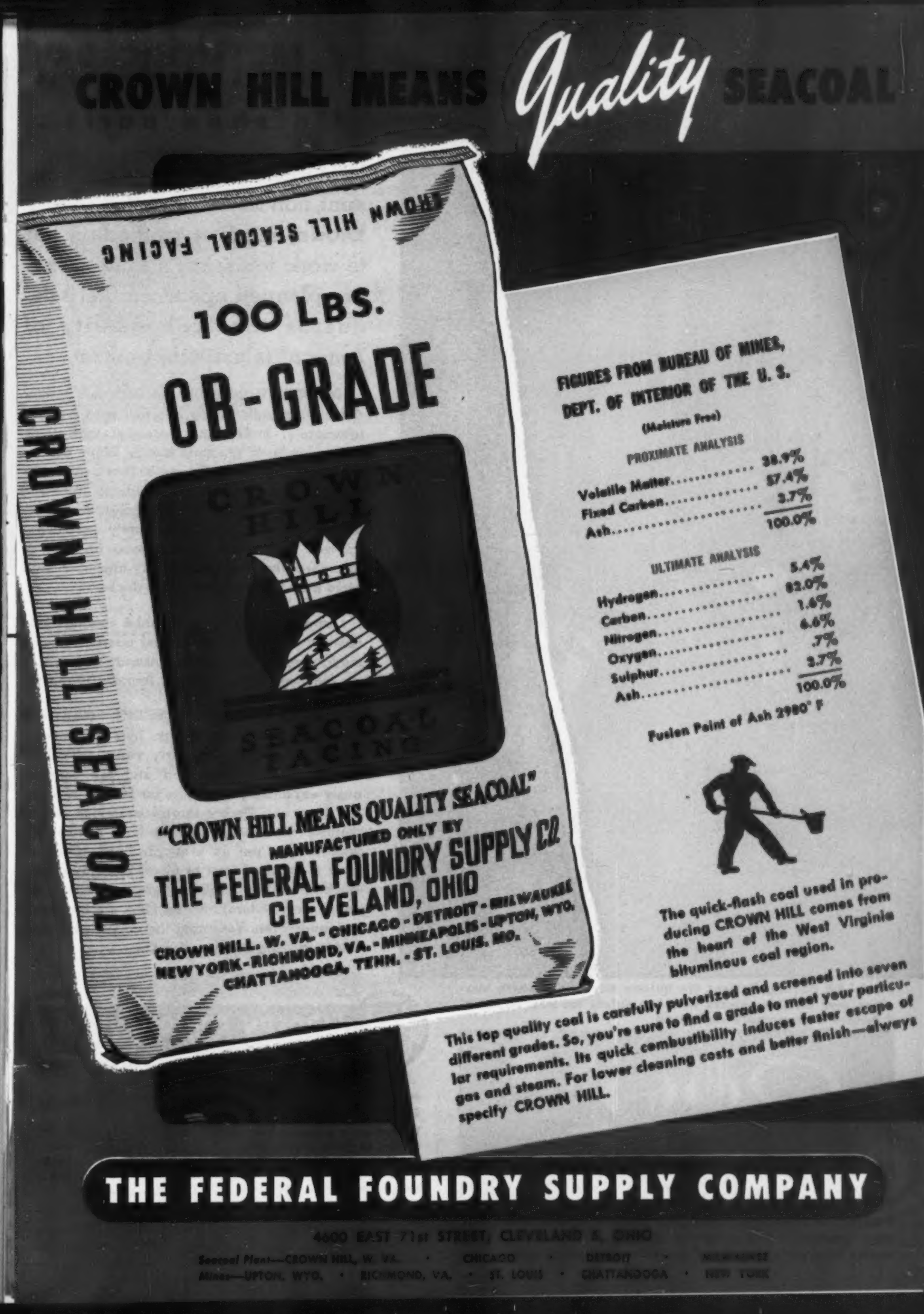
In the duplexing process at Ferro Machine & Foundry Company, molten iron from the cupola is poured into the Lectromelt Furnace. There, elements are added or removed to give the exact composition specified and the charge is superheated electrically to achieve a fine-grain structure. Thus, special irons are produced as regular routine.

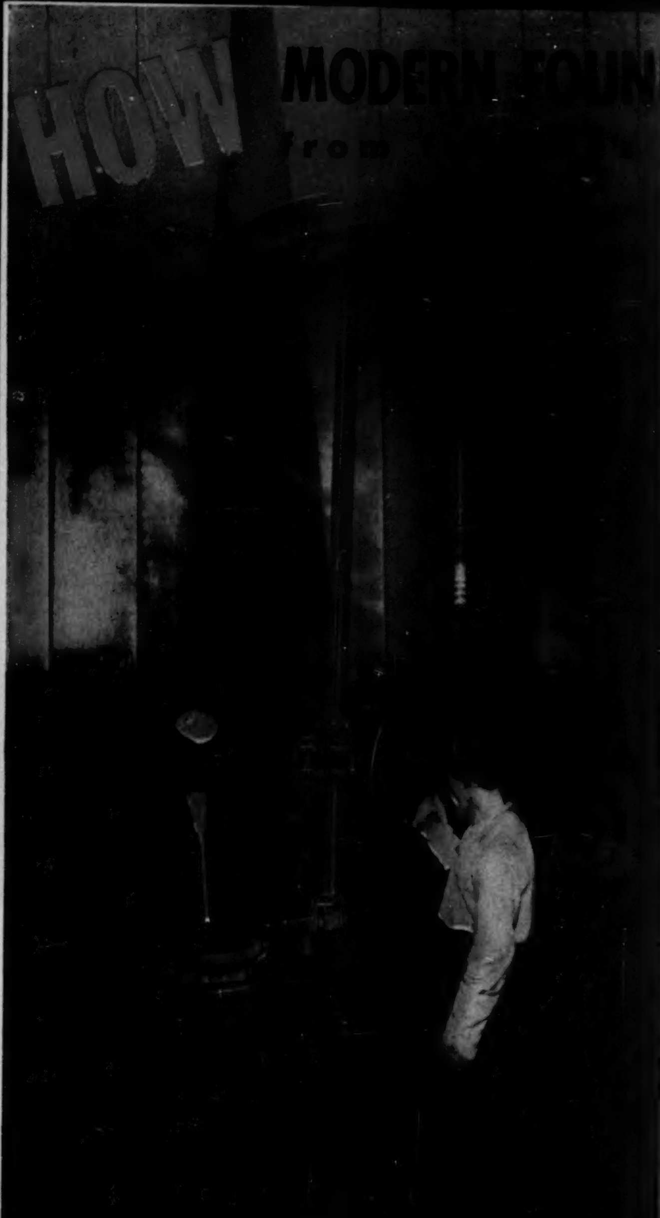
Lectromelt Furnaces range in capacities from 24 pounds to 150 tons, meeting every development and production requirement. They're on melting, refining, smelting and reduction work. For Bulletin No. 7, telling you more about them, write Pittsburgh Lectromelt Furnace Corporation, 316 32nd St., Pittsburgh 30, Pa.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektkougnar A/B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bresseux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*


CROWN HILL MEANS Quality SEACOAL
CROWN HILL SEACOAL FACING
100 LBS.
CB-GRADE
CROWN HILL
SEACOAL FACING
CROWN HILL SEACOAL
"CROWN HILL MEANS QUALITY SEACOAL"
MANUFACTURED ONLY BY
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND, OHIO
CROWN HILL, W. VA. - CHICAGO - DETROIT - MILWAUKEE
NEW YORK - RICHMOND, VA. - MINNEAPOLIS - UPTON, WYO.
CHATTANOOGA, TENN. - ST. LOUIS, MO.
FIGURES FROM BUREAU OF MINES, DEPT. OF INTERIOR OF THE U. S.
(Moisture Free)
PROXIMATE ANALYSIS
Volatile Matter.............. 38.9%
Fixed Carbon.............. 57.4%
Ash.................. 3.7%
100.0%
ULTIMATE ANALYSIS
Hydrogen.................. 5.4%
Carbon.................. 82.0%
Nitrogen.................. 1.6%
Oxygen.................. 6.6%
Sulphur.................. .7%
Ash.................. 3.7%
100.0%
Fusion Point of Ash 2980° F
The quick-flash coal used in producing CROWN HILL comes from the heart of the West Virginia bituminous coal region.
This top quality coal is carefully pulverized and screened into seven different grades. So, you're sure to find a grade to meet your particular requirements. Its quick combustibility induces faster escape of gas and steam. For lower cleaning costs and better finish—always specify CROWN HILL.
THE FEDERAL FOUNDRY SUPPLY COMPANY
4600 EAST 71st STREET, CLEVELAND 5, OHIO
Seacoal Plant—CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE
Mines—UPTON, WYO. • RICHMOND, VA. • ST. LOUIS • CHATTANOOGA • NEW YORK



HOW MODERN FOUNDRY METHODS PAY

from [illegible] to finished parts...

here in one of America's, prominent, non-ferrous foundries every known, modern method is put to work for safety's sake. It's a pre-planned operation that safeguards the high quality of Ampco* (aluminum bronze).

MODERN Pouring Devices with their quick-detachable bails swing into action to handle, alternately, ladles and crucibles with their heavy loads of precious metal. More perishable than fresh milk the metal flows, at highly uniform temperatures and without interruption, from covered, MODERN ladles. And right along with this maximum safety protection, for men and metal, there follows an ease of operation that insures the day-after-day high yield from furnaces to loading docks.

Ampco's* turning of finished castings into finished parts is an interesting operation — as modern as it's melting and pouring methods... as practical as tomorrow's foundry planning.

Through a closely WORKING TOGETHER with successful foundrymen, here and everywhere for more than thirty years, MODERN engineers have pioneered and are continuously expanding new uses for MODERN Pouring Devices. Today there's a Device and a method for every pouring-floor-need. SO, whether you put up a couple floors a day or pour a hundred tons of metal in a round-the-clock operation it will pay you well to get the entire story. Literature and films are available to foundrymen. Returning the coupon will start things moving in your direction . . . .

Model FA Pouring Devices are quickly attached to ladle trunnions and crucible shanks with top safety for pour-off men.
* Ampco — trademark registered

Proving the machinability of good castings in varied machine shop practice is a plus service to Ampco* customers. Parts shown here are examples of precision work produced.

MODERN EQUIPMENT CO.

PORT WASHINGTON, WISCONSIN

MODERN EQUIPMENT COMPANY
Dept. AF-3, Port Washington, Wisconsin

Without cost or obligation mail:

Catalog on metal pouring systems	147	☐
Cupolas and cupola chargers	147A	☐
Cranes and monorail systems	150	☐
More information on FREE use of MODERN films		☐

Company ....

Street .... Zone ....

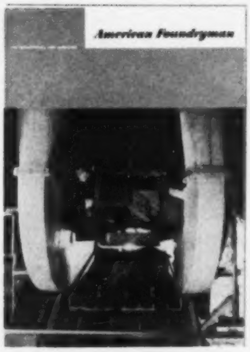
City .... State ....

Individual ....

American Foundryman

march 1952 / Volume 21 • Number 9

OFFICIAL PUBLICATION OF THE American Foundrymen's Society



Workers require no dust masks and still enjoy a 10 per cent cooler atmosphere since Allis-Chalmers Mfg. Co., Milwaukee, designed and installed this dust collecting system on a shakeout in its No. 2 foundry. The system exhausts 16,000 cfm of air. Before installation, average dust count was 40 million particles per cu ft of air. After installation, the count dropped to 10 million. Free silica, previously 12 million particles, was reduced to 3 million — 60 per cent of the maximum specified by Wisconsin's Industrial Commission.

Trends

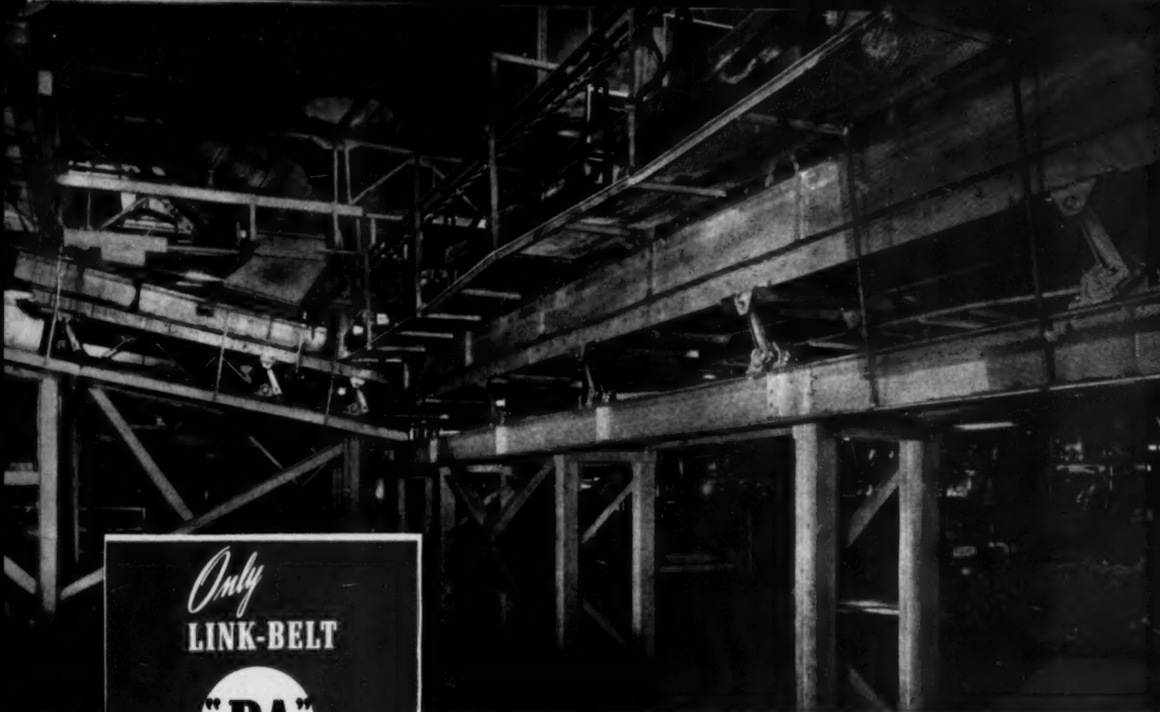
Technology

Operations and methods

In the news

People

Departments



Only
LINK-BELT
"PA"
Oscillating Conveyor

In modernized midwestern foundry, two "PA" Oscillators handle hot castings. Coming in from the left, 50 ft. transfer conveyor feeds 75 ft. cooling and sprueing conveyor. Link-Belt Overhead Trolley Conveyor (above) delivers molds to shakeout.

...gives you these 9 conveying advantages!

1. **"PA" POSITIVE ACTION**—Motion is imparted to the conveyor trough by a roller-bearing, constant-stroke eccentric, driven at selected speed. Uniform, continuous flow is assured regardless of overloads or surges.
2. **LEAK-PROOF**—Standard trough is a single piece of metal with high sides—eliminates leakage and spillage.
3. **DUST-TIGHT**—Escape of dust or gases can easily be eliminated by addition of a metal cover with flexible connections at loading and discharge points.
4. **COMPACT**—A "natural" medium for passing congested locations—opening need be only slightly larger than the trough. Many are installed in small trenches to receive material from apparatus above.
5. **LONG LIFE**—All-metal, with a minimum of moving parts, no joints to abrade. Handles very hot, sharp, jagged or oily materials with virtually no wear.
6. **MINIMUM MAINTENANCE**—Only the drive need be lubricated. Steel torsion bars that provide the spring action last indefinitely without attention.
7. **VERSATILE**—Widths from 8 to 54 in., lengths up to 100 ft. Efficiently handle from a few pounds to 200 tons per hour. Dividers can be installed to convey more than one material simultaneously, and discharge is possible at any desired points.
8. **GENTLE**—No breakage of thin or brittle castings. Even a cigarette ash can travel the entire length of the trough intact.
9. **ECONOMICAL**—Particularly on longer runs, first cost is low. Installation and alignment are simple, fast.

Yes, on any count, Link-Belt "PA" Oscillators are years ahead. These revolutionary conveyors have proved themselves efficient for handling coolant-soaked steel turnings, foundry shakeout sand and castings, and other sharp, abrasive, hot materials. Ask for Book 2444 containing complete information.

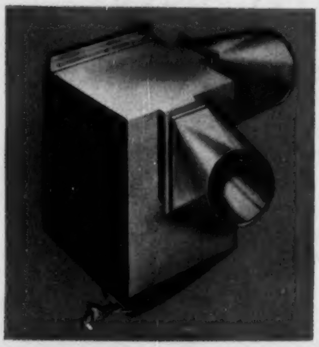
MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

LINK-BELT
CONVEYORS and PREPARATION MACHINERY

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.

12,110

the VELOCITRAP



THE Schneible Velocitrap performs an important function on any dust collecting system, by removing heavy or abrasive solids, or materials of salvage value from the system.

Solid particles are expelled by centrifugal force from the air stream. Through ports in the casing of the unit these particles are deposited in a hopper. Only the minimum size particles reach the dust collector. This saves dust collector capacity and reduces wear on the duct system.

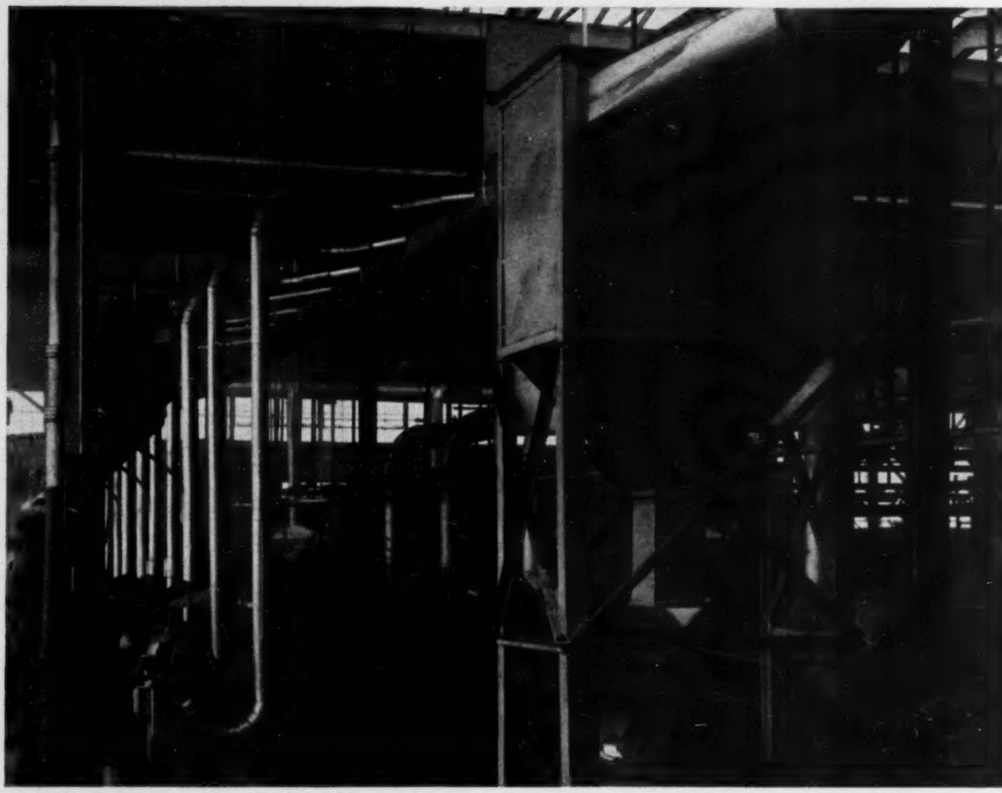
In foundries, the Velocitrap recovers abrasives from cleaning operations, sand from downdraft shake-outs, screens, mullers and sand systems. It eliminates drop-out boxes at grinders and tumbling mills.

The Velocitrap is engineered and constructed for long service and is adaptable to either wet or dry-method dust collecting systems.

Write for details in Bulletin No. 246

CLAUDE B. SCHNEIBLE COMPANY

P. O. Box 502, Roosevelt Annex • Detroit 32, Michigan



PRODUCTS:

Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear Proof" Centrifugal Slurry Pumps

SCHNEIBLE

MANUFACTURERS • ENGINEERS • CONTRACTORS

DUCTILE IRON
Improves Diesel-Engine Pistons

50-pound piston cast in Ductile Iron. At the left is a section. Tests show:

TENSILE STRENGTH	65,000 p.s.i.
YIELD POINT	53,000 p.s.i.
ELONGATION	9.5%

Hydrostatic Destruction test over 18,000 p.s.i.
(Same test on Class 40 iron — 13,000 p.s.i. ultimate.)

Provides High Strength/Weight Ratio along with Outstanding Resistance to Mechanical Wear and Heat

Ductile Iron is a cast ferrous product that combines the *process advantages* of cast iron along with many of the *product advantages* of cast steel...

In less than two years, Ductile Iron has attained wide acceptance because it offers excellent castability, high mechanical properties, and good machinability. Parts cast in Ductile Iron show superior pressure tightness, good elastic modulus and resistance to shock.

High yield strength in combination with toughness renders this new engineering material ideal for automotive and allied services.

TYPICAL CURRENT APPLICATIONS: crankshafts, wrenches, manifolds, fender dies, pumps, clamps, compressor heads, anvil blocks for forging hammers, and other parts too numerous to detail.

YOUR OPPORTUNITY: Join the increasing number of successful foundries now producing Ductile Iron. Write for additional information on the production advantages and types of castings for which Ductile Iron has been adopted... mail the coupon now.

EMBLEM OF INCO SERVICE

The International Nickel Company, Inc.
Dept. AF, 67 Wall Street, New York 5, N. Y.
Please send me a list of publications on: **DUCTILE IRON**

Name...Title..........................

Company...

Address...

City...State..........................

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y

VOLCLAY BENTONITE
NEWS LETTER No. 26

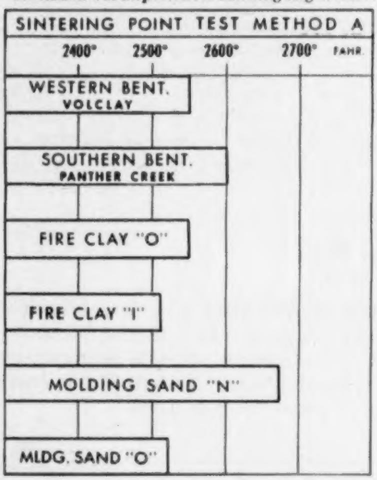
REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

SINTERING

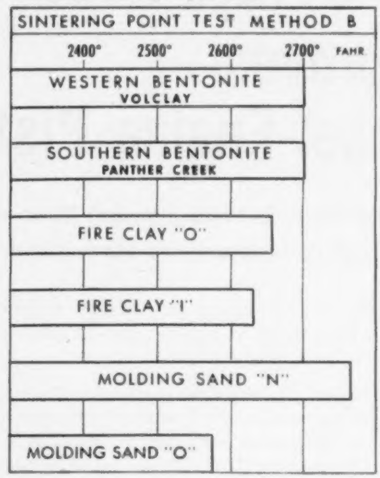
A thin film of sand at the metal-mold interface is elevated to higher temperatures, but only for a very short space of time. Incipient fusion, called "sintering," may occur in this surface film.

The "sintering point" as determined by laboratory test is the lowest temperature at which the first appreciable amount of slag or ceramic flux adheres to a platinum ribbon which has been heated and pressed against the sand specimen. Ordinarily the test observation is made while the ribbon is hot. But in actual foundry practice, sand which sticks to a casting while hot may peel off when it cools, which surely is a desirable outcome and should, for practical knowledge, be a significant point to determine. Therefore the sintering tests on six sands and sand mixtures were performed in two ways.

Test Method A—Sticking to ribbon *while still hot.* After four minutes heating, the ribbon was lifted from the sand specimen and the power was shut off. Two minutes later, while it was still hot, the ribbon was inspected for adhering slag or sand.



Test Method B—Sticking to ribbon *when cooled.* After four minutes heating, the ribbon was lifted from the sand specimen and set aside for 15 minutes to completely cool. The ribbon was then examined for adhering slag or sand.



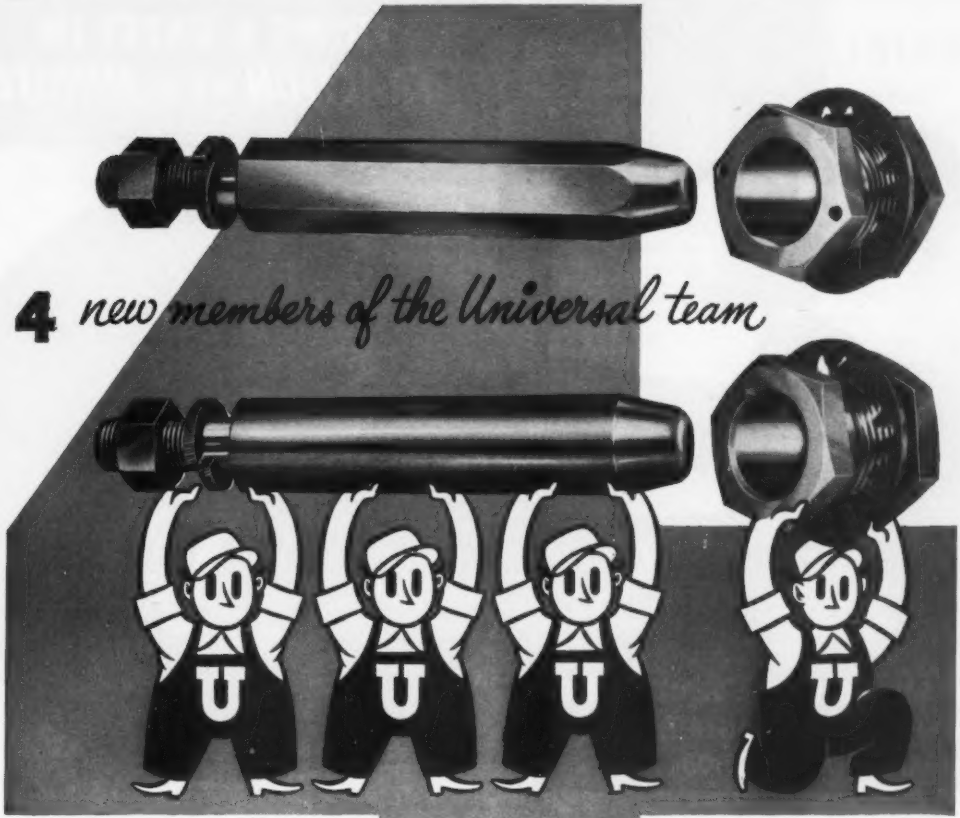
Although bentonites are less refractory than fireclays, the sintering points of the bentonite-bonded sands, and particularly their peeling ability (also of molding sand "N") are slightly higher than for fireclay bonded sands. This is probably due to the larger amount of fireclay used to equalize green strength, but greater shrinkage or contraction of bentonite may also contribute to it.

Dry and hot strength characteristics do not conform to sintering results. Southern bentonite and molding Sand N, both with low dry and hot strength show as good sintering test results as Western Bentonite which has the highest dry and hot strength.

AMERICAN COLLOID COMPANY

Chicago 54, Illinois • *Producers of Volclay and Panther Creek Bentonite*

Two Foundry Problems
Solved BY MANY LEADING FOUNDRIES
LOWEST CASTING REJECTS
By causing a sharp reduction in casting rejects, Famous Cornell Cupola Flux has proved itself an invaluable time and labor saver.
This is achieved by thorough cleansing of molten iron, so that only the purest metal goes into castings. Furthermore, the fluidity of iron is increased, and sulphur reduced.
MORE EFFICIENT AND CONTINUOUS CUPOLA OPERATION
Famous Cornell Cupola Flux keeps cupolas cleaner. Bridging over is practically eliminated. Drops are cleaner. And there is less erosion of cupola lining, due to the formation of a glazed or vitrified surface on brick or stone.
This ensures greatly reduced cupola down time and maintenance labor.
APPROX. 4 lb. BRICK
SCORED BRICK FORM saves labor, cuts fluxing time to a few seconds.
Famous Cornell Cupola Flux is pre-measured. You toss it into the cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges, as per instructions.
Famous CORNELL CUPOLA FLUX
• OVER 34 YEARS' SUCCESS IN CLEANSING MOLTEN IRON FOR BETTER CASTINGS.
WRITE FOR BULLETIN NO. 46-B
The Cleveland Flux Co.
1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO
Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918
FAMOUS CORNELL FLUXES
Trade Mark Registered
BRASS FLUX
FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.
ALUMINUM FLUX
FAMOUS CORNELL ALUMINUM FLUX cleansés molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this' flux is used.



threaded flask pins and bushings now added to the UNIVERSAL quality line

To an already famous team of foundry equipment, Universal has now added a threaded series of Flask Pins and Bushings that will save you precious minutes by assuring instant and accurate alignment of cope and drag. Like other members of this famous team, they'll also save the cost and downtime that replacement always requires because they're heat-treated and precision ground from high quality steel to stand up under rough treatment. Universal threaded series Flask Pins and Bushings are used in steel, aluminum, magnesium or other light metal flasks. Bushings are available in both the round and elongated types; pins in both round and hexagonal types. Universal carries a complete line of sizes of its threaded series as well as its taper and plain series Pins and Bushings as regular stock items. Direct your inquiries and orders to the office nearest you . . . 1060 Broad Street, Newark, N. J., 5035 Sixth Ave., Kenosha, Wisc., or the home office.

150

UNIVERSAL ENGINEERING COMPANY, FRANKENMUTH 12, MICHIGAN

301 Multiple heating units

Several of these 2½ kw units, combined in a single cabinet, have wide use in general induction heating applications. Individual units can be removed and replaced, like a drawer. Heating stations can be located at any position in the production line. The 2½ kw package is called Model 100S; they can be arranged in any combination to meet individual requirements. Equipment includes circuit breakers for primary and heat-on circuits; load indicating ammeter; automatic heat-on timer; filament and heat-on indicators; quick disconnect plugs; and receptacle for connecting power section to heating section. Input requirements per section are 4 kva at 220 v, 60 cps, single phase. *Induction Heating Corp.*

302 Compression tester

Accurate compression and crushing tests are made quickly and easily with the U-13L tester. Load is applied to the specimen through a hydraulic system actuated by compressed air. When connected to an air source, it is ready to go with no warm-up period. The load is indicated on the dial of a double proving ring, used to obtain greater accuracy in the low range and to eliminate the need for changing rings for different ranges. Load can be released at any time during the test or at point of failure to keep specimen intact for measurements, photographs, drying, or similar requirements. The low range of the double ring is sensitive to 0.1 lb. Standard model has a capacity of 350 lb under an operating air pressure of 100 psi, but machines with capacities to 1000 lb can be supplied on order. *Labquip Corp.*

303 Refractory brick

A clay-graphite refractory brick called Graftex is designed to increase the life of installations having slag erosion problems. It is prefired, and has the outstanding ability of shedding slag; successful installations include ladles, blast furnace splasher plates and runners, cupola spouts and forehearths, etc. Brick is available in 9-in. straights and most standard 9-in. series. *North American Refractories Co.*

304 Mercury lamp

Efficient 1000-watt mercury lamp has uses where medium or high-bay lighting is needed. Producing 52,000 lumens—52 lumens per watt—its life rating is 3000 hr at 5 burning hours per start, or 4000 hr at 10 burning hours per start. It operates satisfactorily in any position. Power required is 440-480 volts. Designated the A15, the lamp has an overall length of 14¾ in. *General Electric Co.*

305 Electric tractor

Rated in the medium-duty class, Model A-545 electric tractor is rated at 400 lb normal and 2000 lb maximum drawbar pull. Two-wheel drive moves it at a light running speed of 7½ mph when powered by the specified 48-volt battery. Steering is by tiller bar, which operates all 4 wheels. Speed is manually controlled by 3-speed switch on standard units, although foot acceleration is available. *Mercury Mfg. Co.*

products and processes

For additional information, use postcard at bottom of this page

306 Wheeled dust pan

Push this device up to the dirt, sweep the dirt directly in, and wheel it away. Cart weighs 45 lb, with an overall height of 48 in. and two 8-in. rubber-tired wheels. Metal pan measures 18 x 18 x 18 in. and is made of 16-gauge sheet steel. Frame is 1 x 1½ x ⅛-in. angle iron, with a handle of 1-in. tubing. *Palmer-Shile Co.*

307 Dye penetrant formula

Improvements on the established Dy/Chek dye penetrant inspection formula consist of making it more sensitive and non-toxic. In use, a red dye is applied to a pre-cleaned surface to be tested, and allowed to dwell; dye is then removed from the surface and a white developer applied. Developer reacts with any dye left in the flaws. Process is relatively inexpensive, can be used on both ferrous and non-ferrous metals, can be used anywhere, and is accurate. *Turco Products.*

308 Impregnating systems

Magnesium, aluminum, and other nonferrous castings are impregnated with certain compounds to overcome porosity. Many such castings otherwise scrapped can thus be saved. These completely integrated impregnating and drying units will do the trick. *Process Industries Engineers, Inc.*

continued on page 85

Reader's Service Dept.

52|3

Please send me detailed information on the Products and Processes and Free Foundry Information circled.

301	302	303	304	305	306	307	308
309	310	311	312	313	314	315	316
317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332
333	334	335	336	337	338	339	340

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AMERICAN FOUNDRYMAN

616 S. Michigan Avenue

Chicago 5, Illinois

free | foundry information

For additional information,

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316 Carbon, graphite brick

Revised Catalog Section S-6210 lists the principal features of carbon, graphite, and impervious graphite, giving typical applications. Complete tables are given for brick sizes, shapes, grades, and physical properties, with special information on graphite beams, blocks, plates, and rods. Suitable cements are also presented. *National Carbon Co., a Div. of Union Carbide & Carbon Corp.*

317 Have clean air

Design data, principles of operation, and efficiency curves are compiled in dust collector bulletin "Aerodyne". Basically, the collector consists of a louvered cone so built that air escapes through the louvers while dust drops through a hole in the bottom for removal. Manufacturer reports these advantages: high separation efficiency independent of the volume of gas handled; resistance to erosion from abrasive dust; no filter clogging; no moving parts; low pressure drop; and extreme flexibility of design to fit where needed. Bulletin also contains a reprinted article on recovering very fine metal dusts. *Aerodyne Development Corp.*

318 Vibrating conveyors

Dimensions, weights, capacities, and power requirements for two series of oscillating conveyors are presented in 24-page Book 2444. Illustrations show the handling of shakeout sand, hot mineral sands, hot castings, coal, ore, and similar products. Units can be used for conveying, feeding, cooling, and screening. *Link-Belt Co.*

319 Arc Welding Electrodes

19-page booklet, containing 32 illustrations, charts and diagrams, summarizes results obtained at Philadelphia Naval Shipyard's Industrial Test Laboratory with nickel-molybdenum-vanadium alloy steel shielding arc weld electrodes. These rods, according to test reports, without preheat in high-strength steels, gave crack-free welds which in as-welded condition consistently exceeded 110,000 psi yield strength with maximum ductility. Operating characteristics, welding procedure and importance of low moisture content in electrode coating are described. *International Nickel Company.*

320 Chain Drives and Conveyors

Bulletin 51-7, covering installation, operation and maintenance of chain drives and conveyors, shows how to get the most service from sprocket chains. Illustrations show correct and incorrect ways of solving these problems. *Chain Belt Co.*

321 Materials Handling Study

Second in a series of case study reports, No. 242 shows how a Georgia metal working plant has cut its materials handling cost 36 per cent by installing Baker fork trucks. Report contains action photos showing unloading and production handling. *Baker Industrial Truck Division, Baker-Raulang Co.*

322 Fork Trucks

16-page Bulletin P809 describes applications, types and operational features of the Yale line of motorized hand trucks and electric stackers. Special section shows attachments available for Worksavers that permit handling of a wide range of objects without pallets. *Yale & Towne Mfg. Company.*

323 Electric Heaters

"Chromalox," issue 45, includes an article on the use of electric heaters for ladle drying. Other articles cover ovens and similar devices. *Edwin L. Wiegand Company.*

324 Electroplating Steel

Many illustrations clarify the text of this 28-page booklet listing specific improvements that can be made in the average cycle for cleaning before electroplating, and describing in detail 4 helpful steps in obtaining superior cleaning of both low and high carbon steel. *Oakite Products.*

325 Products and services

Containing 59 printed pages plus several additional blank pages for notes, ring-bound Bulletin G-63 gives salient data on products and facilities offered. Of special interest to foundrymen are open and closed circuit pulverizers for coal and similar raw materials; pulverized coal burners; liquid and gaseous fuel burners; various refractories; castings; and the

continued on page 92

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317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332
333	334	335	336	337	338	339	340

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Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

CHROMIUM...key metal for strength, corrosion resistance, and heat resistance

Chromium is one of the most important alloying elements in iron and steel metallurgy since it markedly improves certain chemical and physical properties.

Increases Strength

The strength of steels is greatly increased by chromium because it retards the transformation of certain constituents during rapid cooling.

This makes it possible to obtain great depth of hardness in high-carbon steels, toughness in structural steel, and high strength and ductility in heavy sections. Chromium also increases resistance to shock by refining the grain of the steel.

Of all the alloying elements, chromium is probably the least expensive for increasing the tensile strength of steel. Additions of as little as 0.25 to 1.25 per cent chromium will increase the chill and hardness of the steel, as well as the tensile strength.

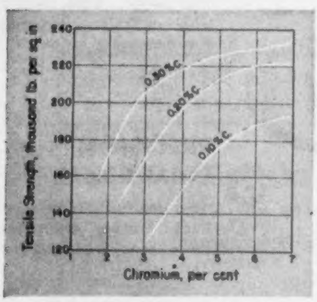


Fig. 1. Chromium increases the tensile strength of air-cooled steels of varying carbon content.

In copper, aluminum, and other non-ferrous alloys, chromium provides increased strength, also.

Imparts Corrosion Resistance

Commercially, chromium is added to steel and iron in amounts up to 30 per cent for the purpose of improving corrosion resistance.

In general, as the chromium content is increased with a given carbon content, the resistance of the steel to corrosive media becomes greater. The well-known "stainless" steels resist corrosion because substantial percentages (usually 12 per cent or more) of chromium are present.

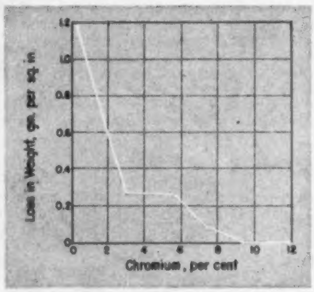


Fig. 2. Results of atmospheric corrosion tests on low-carbon steels of different chromium contents after 10 years of exposure to an industrial atmosphere.

Improves Heat Resistance

In both cast iron and steel, chromium provides good resistance to deterioration from heat. The use of chromium-alloyed iron and steel where high temperatures are encountered, for example, helps to prevent oxidation, which would ruin equipment. As little as 1 to 2 per cent chromium is added to cast iron to improve oxidation resistance and reduce growth of grate bars subject to high temperatures. Oxidation resistance improves progressively as the chromium is increased. Steels containing as little as 5 per cent chromium show good life at temperatures up to 1200 deg. F. For higher temperatures, appropriate steels of higher chromium content may be selected. Steels containing 25 to 28 per cent chromium give satisfactory service at temperatures up to 2100 deg. F.

Alloy cast irons with 15 to 30 per cent chromium are commonly used for applications requiring resistance to severe heat and abrasion.

In non-ferrous alloys, also, chromium is an important constituent for heat and corrosion resistance. It is used in the production of non-ferrous metal-cutting tools, chromium bronzes, and electrical resistance alloys.

Available Alloys

Chromium is produced by ELECTROMET in the forms listed below which are suitable for every use of the iron, steel, and non-ferrous metal industry.

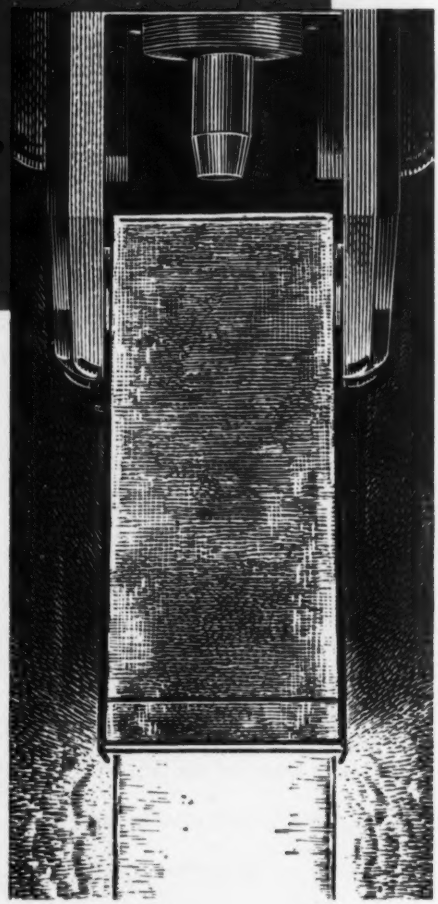
Alloys of Chromium and Their Uses

Low-Carbon Ferrochrome	For production of corrosion- and heat-resistant steels, commonly known as the "stainless steels," as well as special high-temperature alloys in which a low carbon content is desirable.
High-Carbon Ferrochrome	For production of chromium-bearing steels that do not require low percentages of carbon. Also used for adding chromium to cast iron.
Nitrogen-Bearing Ferrochrome	For reducing grain size and improving physical properties of high-chromium steels.
"EM" Ferrochrome-Silicon	Used in the production of stainless steels for adding chromium to the bath, and for reducing oxidized metals in the slag back into the bath.
"EM" Ferrosilicon-Chrome	Readily soluble material for making either furnace or ladle additions of chromium to steels.
"SM" Ferrochrome	Readily soluble material for making chromium additions to steel or cast iron in either the furnace or the ladle.
Foundry Ferrochrome	Especially for use in making readily soluble ladle additions of chromium to improve composition and properties of cast iron.
Chromium Metal	For use in non-ferrous chromium-bearing alloys, such as electrical resistance alloys, high-temperature and corrosion-resistant alloys, metal-cutting tools, chromium bronzes, and certain high-strength aluminum alloys.
"EM" Chromium Briquets	For adding chromium to cast iron in the cupola.

Illustration shows cope and drag set on fender pattern for STAR PATTERN & MFG. CO., Benton Harbor, Mich.

POUR FASTER...

STRIP FASTER...



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Foundrymen in the news


W. H. MacNeill

William J. MacNeill has been appointed vice-president in charge of operations by Badger Malleable & Mfg. Co., South Milwaukee, Wis. Holding an AB from Indiana University and an MS from the University of Wisconsin, Mr. MacNeill has been in the foundry field since 1919, when he started with Federal Malleable Co., West Allis, Wis. Coming up through the ranks to become president and general manager, he resigned in 1945 to become general manager of GHR Foundry Div., Dayton Malleable Iron Co., Dayton, Ohio. He is a member of Gray Iron Founders' Society and a past director of A.F.S.

William J. Grede, president of National Assn. of Manufacturers and president of Grede Foundries, Inc., Milwaukee, received the Milwaukee Cosmopolitan Club's 1951 Distinguished Service Award at a dinner last February 13. Award is based on civic, religious, and philanthropic services to the community.

George E. Brown has been employed as sales engineer for graphite products by United States Graphite Co., a division of Wickes Corp., Saginaw, Mich. Previous affiliations include United States Steel Corporation.

Dennis E. Harvey was recently elected vice-president of Magnesium Co. of America, East Chicago, Ind. He will head the company's Washington, D.C., office. **William Johansen,** former southwestern district manager, was appointed general sales manager in East Chicago. **Charles J. Futterer,** formerly Johansen's assistant, succeeds him.

Charles H. Barnett became assistant to the president of Foundry Equipment Co., Cleveland, in February. He has been with the company since 1947, serving as sales engineer and handling technical publicity.

Harry A. Fey succeeds **F. J. Armstrong** as traffic manager of United States Radiator Corp., Detroit, moving up from assistant traffic manager. Mr. Fey has been with the company for the past 30 years.

William G. Thannert has been named factory manager of Trackson Co., Milwaukee, a subsidiary of Caterpillar Tractor Co., Peoria, Ill. Thannert was previously general planning superintendent for Caterpillar, where he has worked since 1936. Caterpillar's assistant director of sales, **J. W. Mohler,** will become deputy director of the Construction Machinery Div. of NPA for the coming year. He was on similar leave from the company during the last war, serving on WPB.

Fred P. Biggs has been elected as vice-president of American Brake Shoe Co., New York. He is also president of the company's Brake Shoe & Castings Div. Mr. Biggs has served in several sales positions since he joined the company in 1916. He was designated vice-president in charge of sales for both Brake Shoe & Castings and Southern Wheel Div. in 1944, becoming president of the former division in 1950.


F. P. Biggs

Arthur V. Davis, Aluminum Co. of America, New York, was re-elected chairman of the board. Vice-presidents re-elected were **I. T. Bennett,** Revere Copper & Brass, Inc., Baltimore, Md.; **L. M. Brile,** Fairmont Aluminum Co., Fairmont, W. Va.; and **E. G. Fahlman,** Permold Co., Medina, Ohio. Directors elected for three-year terms were **Frank B. Cuff,** Aluminum Co. of America; **R. O. Farrell,** Fairmont Aluminum Co.; and **W. A. Singer,** Apex Smelting Co., Chicago. **L. E. DeGroat,** Permold Co., was named to head the Foundry Division in 1952, while **Harry J. Hater,** Aluminum Industries, Inc., Cincinnati, will represent the division on the board of directors.

Robert F. Grover assumed the presidency of Love Brothers, Inc., Aurora, Ill., on January 1, 1952. Other officers appointed at that time include **Benjamin G. Griswold,** vice-president in charge of machine shop; **Robert S. Hendry,** vice-president in charge of foundry; and **Bernice Nashold,** secretary and assistant treasurer of the firm.

Ray Ortgies has been appointed foundry supervising engineer for the Dust Control Div., American Air Filter Co., Inc., Louisville, Ky. Previous affiliations include manager of the Air Cleaning Div., Whiting Corp., Harvey, Ill. Mr. Ortgies is an ME major from the University of Illinois. He is a member of A.F.S. and has served on various committees on air pollution.


Ray Ortgies

Charles S. Craigmile, president and director of Belden Mfg. Co., was elected president of the National Metal Trades Association at its 52nd annual convention on Nov. 15. Others elected to office were **Earle S. Day,** vice-president and general manager of Collyer Insulated Wire Co., Pawtucket, R. I., who was elected first vice-president of the association; and **Norman L. Rowe,** vice-president of Ideal Roller and Manufacturing Co., Chicago, who was elected second vice-president and treasurer of

the association. **Joseph L. Kopf,** president of Jabez Burns and Sons, New York, is the retiring president.

Francisco Diaz Covarrubias, metallurgical engineer, La Consolidada SA, Mexico City, Mexico, is completing a 3-month study of steel foundry practice in this country. Following a stay of six weeks at Texas Electric Steel Castings Co., Houston, Texas, he visited shops in eastern and midwestern foundry centers. He is secretary-treasurer of the A.F.S. Mexico City Chapter.

John J. Host and **William A. McCarthy** are now midwest district manager and field engineer, respectively, for Tracerlab Inc., Boston, Mass. Chicago sales offices have been moved to 325 W. Huron Street.

A. W. Winston, assistant manager, Magnesium Dept., Dow Chemical Co., Midland, Mich., was unanimously re-elected to a third term as president of the Magnesium Association at its 7th annual meeting. **Otis Grant,** Superior Bearing Bronze Co., Brooklyn, N. Y., was re-elected treasurer, and **E. H. Perkins,** Brooks & Perkins, Inc., Detroit, was elected vice-president. **Martha I. Hansen** of the association will continue as assistant secretary.

A. B. Stevens

Andrew B. Stevens has been promoted to the position of assistant factory manager by American Wheelabrator & Equipment Corp., Mishawaka, Ind. He formerly held the position of supervisor of production control and stores with the company.

Drury I. Conner has been appointed Washington representative by Bohn Aluminum & Brass Corp., Detroit. He will handle government agency contact work for the corporation.

Donald J. MacPherson and **Harold D. Kesler,** research metallurgists in the metals department of Armour Research Foundation of Illinois Institute of Technology, Chicago, have been promoted to supervisor. MacPherson will head the physical metallurgy section, while Kessler will supervise the nonferrous metallurgy section.

William B. Sherman has been named sales manager for the Wahlstrom-Float Lock sales department, General Products Div., American Machine & Foundry Co., New York. **Charles Wiedman** will assist him.

Henry N. Shoiket is the new head of mechanical engineering, Sam Tour & Co., Inc., New York. Mr. Shoiket is a CCNY graduate, cum laude, in mechanical engineering.

George O. Curme, Jr. has been elected a director of Union Carbide & Carbon Corp., New York. As vice-president, he is in charge of all research activities of the corporation. He succeeds the late **James A. Rafferty,** vice-president and director.

Roy W. P. Johnson was recently appointed to the sales engineering staff of Cooper-Bessemer Corp., Mt. Vernon, Ohio. He will be located in the company's New York offices under the direction of **James W. Reed.**

John W. Janca has been named sales manager for Westlectric Castings, Inc.,

J. W. Janca

Los Angeles. A graduate of Illinois Wesleyan University, Mr. Janca joined Westlectric in 1942 as a member of the production control department. Since 1948 he has been in sales.

Robert J. Loskill has been named manager of the sales training division of Caterpillar Tractor Co., Peoria, Ill. **Thomas A. Glass** succeeds him as assistant manager of the governmental division, a position which Loskill held for the past three years.

George C. Floyd has been elected vice-president, Vanadium Corporation of America announced recently. Since 1947 Mr. Floyd has been vice-president of Thomas Steel Co. He is a member of ACS, ASM, AISI, ES, and AIMME.

L. F. Miller

Leon F. Miller has been elected a director of Osborn Mfg. Co., Cleveland. He has been with the company for the past 23 years, having joined them in 1929 as a draftsman after graduation from Case Institute of Technology. In 1935 he was promoted to sales engineer; in 1944 he was made sales manager; and in 1950 he was elected vice-president.

Donald H. Risher has been appointed to the sales staff of Frederic B. Stevens, Inc., Detroit. He will operate from the Buffalo, N. Y., branch. A conultant before joining Stevens, he is a member of the American Society of Metals, American Ordnance Association, and A.F.S.

Donald T. Fowler and **James M. Bugbee** have been appointed to the advertising department of Baroid Sales Div., National Lead Co., Houston, Texas. Fowler becomes advertising manager, while Bugbee assists. Both have engineering and advertising experience.

Walter L. Seelbach, president of Superior Foundry, Inc., Cleveland and of A.F.S., on January 15 awarded certificates of accomplishment and initialed belts to 19 company employees who completed a course in foundry technology. This group was under the direction of **James Goldie,** and included **William Hampton, Paul Schweitzer, John Sibbison, Nick Strogonow, Joseph Panzuto, Arthur Sauline, Edward Patrick, Jerry Novotny, Albert Supik, George Montowski, Arthur Jaworski, William Nowak, Byron Kennel, Alfred Ward, Howard Schaffer, John Balsay, Stanley Hemel, and Leonard Kasco.**

A. P. Cochran, Cochran Foil Co., Inc., Louisville, Ky., was re-elected president of the Aluminum Association at its annual meeting last January in New York.

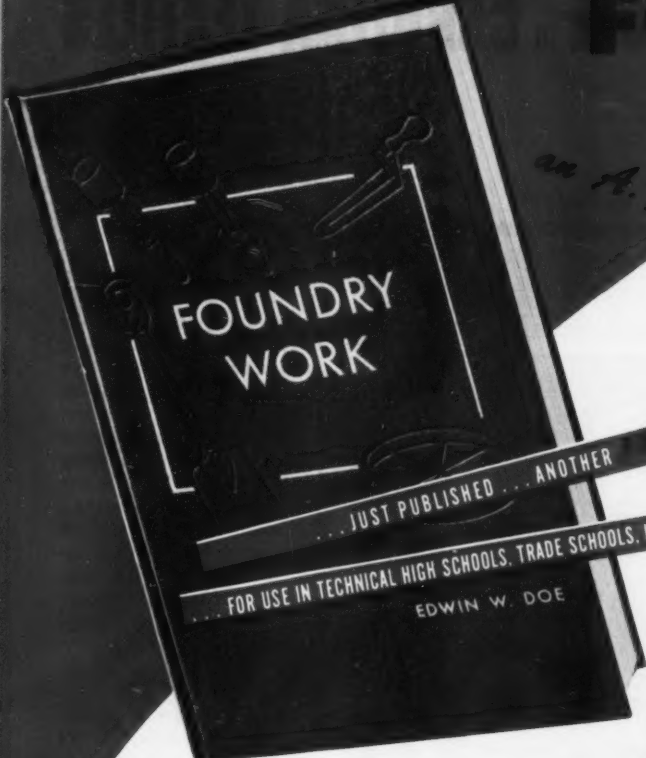
William M. Wallace has been appointed assistant to the vice-president of Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee. **Elvin R. Danielson** replaces **Robert T. Ward** as supervisor of priorities under Mr. Wallace. The latter,

continued on page 97

FOUNDRY WORK

an A.F.S. Endorsed

FOUNDRY TEXTBOOK



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trends

Functional "new look"...

Dan E. Smith

■ This month there are many changes in the design of AMERICAN FOUNDRYMAN, intended to increase its readability. They are the work of Dan E. Smith, director of design and typography for Poole Bros. Inc., Chicago, where he has been a crusader for clean-cut, readable, visual forms in all variations of the printed page.

The cover is distinctively quiet, yet more dramatic in its picture story presentation. The contents page has been redesigned entirely, to allow glance-quick reference to specific types of editorial content. The three-column make-up is more flexible, more readable, and gives the illusion of a larger page.

To increase readability further, the main text sections are set in big, easy-going type, with subheads flush left for visual comprehension. The new headings give sparkle and color interest to the pages, and aid in producing a faster reading flow of type material. Regimentation and alignment of pictorial material makes for orderly presentation and captioning and for rapid reading.

In redesigning AMERICAN FOUNDRYMAN, Smith says he "tried to avoid the type of false modernity, usually accomplished by graphic tricks." The design is intended "to be functional rather than merely look functional." Each division of material has its own form, but is visually related to other material throughout the publication.

Smith is a specialist in organization and engineering of printed matter of all types. Author and lecturer on graphic arts, he is a member of leading graphic arts organizations. Since 1943 his work has won 35 prizes at the rate of two to seven awards annually in national competition. He expects to retire some day and print fine books on a private press.

"Every Foundry in '52"...

■ Early sell-out of exhibit floor space, heavy assignment of hotel rooms, and largest ladies registration indicate high interest and presage record attendance at the 1952 International Foundry Congress and 56th Annual A.F.S. Convention and Show, May 1-7, Atlantic City, N. J. Numerous operating exhibits will be featured this year and one exhibitor using 4000 sq ft of space (largest ever held by a single company) will display 34 pieces of operating equipment.

The 3000 hotel rooms already assigned equals the maximum allotment given by the hotels in other cities. But in Atlantic City, there is ample space with more than half of the 6300 rooms guaranteed for A.F.S. use available despite early demand.

Ladies registration normally runs about 300 but already hotel rooms for over 700 have been requested. This indicates attendance of well above 1000 at the Annual Banquet. Replacing the traditional formal address at the Banquet this year is a program of entertainment—a new trend in A.F.S. Conventions.

The goal of representation from "Every Foundry in '52" seems close.

Plans reach final stages for 1952 A.F.S.

International Foundry Congress

■ As the world's outstanding foundry event of 1952 nears—the International Foundry Congress & Show, Atlantic City, N. J., May 1 through 7—foundrymen of six continents are expected to be on hand to take part in the "Greatest Foundry Show on Earth."

From the United States and Canada, "Every Foundry in '52" is expected to be represented, as are their brothers-in-craft from Mexico, the United Kingdom, Belgium, France, Switzerland, Ireland, Australia, South Africa, India, Sweden, Italy, Brazil, Norway, Sweden, Denmark, and the Netherlands.

Your admission ticket . . .

Technology + tools

Running simultaneously throughout the entire week will be the two principal overall attractions, a technical program featuring latest developments in foundry technology related by the world's outstanding foundrymen, and the Foundry Show, one of the greatest exhibits of new tools for the foundry industry of all time. Closely allied to the technical program and Show will be plant visitations to area foundries, arranged by the A.F.S. Philadelphia Chapter, social and recreational events, and a week-long program of Ladies' Entertainment.

NAM president to speak

Highlight events of the 1952 A.F.S. Foundry Congress & Show include a colorful Opening Day Ceremony, the A.F.S. Chapter Officers and Directors Dinner, Annual A.F.S Business Meeting, Charles Edgar Hoyt Annual Lecture, Annual Banquet, Canadian Dinner, International Reception and International Educational Dinner. This year, for the first time in A.F.S. history, the Alumni Dinner will be open to all foundrymen. Speaker will be William J. Grede of Grede Foundries, Inc., Milwaukee, newly elected president of the National Association of Manufacturers—the first foundryman to hold this office. An invitation is extended by the Alumni to all foundrymen to attend.

Another innovation will be the featuring of top professional entertainment at the Annual Banquet instead of the traditional speaker.

Annual Business Meeting of the Society will feature the President's Annual "State of the Society" address, election of A.F.S. officers and directors, and presentation of first prizes to winners of the 1952 A.F.S. Apprentice Contest. Immediately following the Annual Business Meeting will be the year's top foundry technical address, the Charles Edgar Hoyt Annual Lecture, to be given by John S. Bugas, vice-president Industrial Relations, Ford Motor Co. He will discuss *"Frontiers in Industrial Relations."*

Two luncheon meetings which proved extremely popular last year, the Defense Production Luncheon and the Equipment and Supplies Luncheon, will again be held. The Defense Production Luncheon, which affords foundrymen an opportunity to discuss their problems with top National Production Authority officials, will be divided into two luncheons, one for non-ferrous foundrymen on May 1, and one for ferrous foundrymen on May 5.

100 papers scheduled

Technical program for the '52 International will include sessions, Round Table Luncheons, Shop Courses and symposia covering virtually every phase of metal casting.

More than 100 major technical papers are scheduled for presentation by internationally known authorities in all casting fields.

Preprints of Congress technical papers will be mailed March 14 to all members who have requested them. Purpose of preprinting these papers is to provoke written discussion which will become an important supplement to the paper when it is subsequently published in A.F.S. Transactions. Discusser is requested to submit his written discussion to A.F.S. Headquarters in duplicate and to bring a third copy with him to the Congress for presentation immediately following that of the paper.

In addition, the Pittsburgh Foundrymen's Association at Pittsburgh, Pa. is also cooperating in that city.

Present indications are that from 175 to 200 overseas foundrymen will participate in these important Study Tours, developed in the interest of increased foundry productivity abroad. Word comes from MSA European Headquarters in Paris, France, that the MSA party will sail on the "S. S. Queen Mary" to arrive in New York City April 14. A series of orientation sessions will follow on arrival in this country, including an all-day industry briefing on April 16 by foundry officials and operators. This briefing will emphasize the

shown in the tours by foundrymen in France, United Kingdom, Ireland, Switzerland, Norway, Sweden, Germany, Italy, India, Belgium and Holland. No previous meeting of A.F.S. has attracted such a world-wide interest as the 1952 A.F.S. International Foundry Congress Show.

Overseas foundrymen planning to attend the 1952 International are urged to contact their respective member associations on the International Committee of Foundry Technical Associations; OSR missions or American embassies in their respective countries, local offices of Thos. Cook & Son, or Tom Makemson, Secretary, Institute of British Found-

. . . to the "Greatest Foundry Show on Earth," Atlantic City, May 1-7.

Since this year for the first time no stenotype record will be made of technical sessions, it is important that all discussions be written.

International study tour

An extensive list of modern foundry operations has been developed by A.F.S. Chapter Committees in those cities to be visited by the two International Study Tours planned for the convenience and benefit of overseas visitors to the International Foundry Congress. The tour itineraries, briefed in the February issue of AMERICAN FOUNDRYMAN, will include New York, Buffalo, Cleveland, Detroit, Chicago and Cincinnati and the Chapters at each point have set up Plant Visitations Committees to cooperate with MSA and Thos. Cook & Son in arranging local plant inspection trips for the overseas visitors.

principle back of America's high productivity.

While each Study Tour will cover a definite itinerary, both will converge on Atlantic City the morning of May 1 for the entire week's program. During Congress week all foundrymen present will be able to visit nearby plants through arrangements made by the Philadelphia Chapter. The Society is arranging special charter bus tours on Friday, May 2 and Tuesday, May 6 for all-day visits to certain selected operations in the Philadelphia area.

MSA to cooperate

At least two regular MSA Productivity Tours will be involved in the International Study Tours, and great interest is evident on the part of foundrymen from many countries. To date, specific interest has been

rymen, immediately for tour information and reservations.

Prospective tour members are requested to furnish information as to the type of operations they desire to see primarily, i.e., gray iron, steel, malleable, brass and bronze, aluminum and magnesium, patternmaking, etc.

The gigantic Foundry Show, scheduled to run throughout the entire week of May 1 through 7, is already 98 per cent sold out. More than 250 of the world's foremost manufacturers of foundry equipment, supplies and services will exhibit their wares on a single floor of the Atlantic City Convention Hall, largest auditorium in the world. For a list of the firms and organizations exhibiting at the 1952 A.F.S. International Foundry Congress & Show, see the Partial list of Exhibitors on following pages.

▶ Partial list of exhibitors

1952 A.F.S. International Foundry Congress & Show

Accurate Match Plate Co., Inc.........Chicago.
Adams Co.........Dubuque, Iowa.
Advance Glove Mfg. Co.........Detroit.
Aerodyne Development Corp.........Cleveland.
Air Reduction Sales Co.........New York.
Ajax Electrothermic Corp.........Trenton, N. J.
Ajax Engineering Corp.........Trenton, N. J.
Ajax Flexible Coupling Co., Inc.........Westfield, N. J.
Allis-Chalmers Mfg. Co.........Milwaukee.
Alloy Metal Abrasive Co.........Ann Arbor, Mich.
Alpha-Lux Co., Inc.........New York.
American Air Filter Co., Inc.........Louisville.
American Clay Forming Co.........Tiffin, Ohio.
American Colloid Co.........Chicago.
American Fire Clay & Products Co.........Canfield, Ohio.
American Gas Association.........New York.
American Lava Corp.........Chattanooga.
American Metal Market.........New York.
American Refractories & Crucible Corp.....North Haven, Conn.
American Silica Sand Co.........Ottawa, Ill.
American Steel Abrasive Co.........Galion, Ohio.
American Wheelabrator & Equipment Corp.....Mishawaka, Ind.
Apex Smelting Co.........Chicago.
Archer-Daniels-Midland Co.........Cleveland, Ohio.
Asbury Graphite Mills, Inc.........Asbury, N. J.
Atlas Plastic & Aluminum Plate Co.........Butler, Wis.
Ayers Mineral Co.........Zanesville, Ohio.

Bakelite Co.........New York.
Baroid Sales Div., National Lead Co.........Chicago
C. O. Bartlett & Snow Co.........Cleveland.
Bay State Abrasive Products Co.........Westboro, Mass.
Beardsley & Piper Div., Pettibone Mulliken Corp. ......Chicago.
Black Sivalls & Bryson, Inc.........Kansas City, Mo.
Blaw-Knox Div. of Blaw-Knox Co.........Pittsburgh.
Bloomsbury Graphite Co.........Bloomsbury, N. J.
Borden Co.—Chemical Div.........New York.
Buckeye Tools Corp.........Dayton, Ohio.

Campbell-Hausfeld Co.........Harrison, Ohio.
Canton Chaplet & Mfg. Co.........Canton, Ohio.
Carborundum Co.........Niagara Falls, N. Y.
Chain Belt Co.........Milwaukee.
Chicago Pneumatic Tool Co.........New York.
Clearfield Machine Co.........Clearfield, Pa.
Cleco Div., Reed Roller Bit Co.........Houston, Tex.
Cleveland Flux Co.........Cleveland.
Cleveland Metal Abrasive Co.........Cleveland.
Cleveland Vibrator Co.........Cleveland.
Climax Molybdenum Co.........New York.
L. A. Cohn & Bro., Inc.........Chicago.
Colonial Smelting & Refining Co., Inc.........Columbia, Pa.
Combined Supply & Equipment Co.........Buffalo.
Connecticut Coke Co.........New Haven, Conn.
Corn Products Sales Co.........Columbia, Pa.
G. & W. H. Corson, Inc.........Plymouth Meeting, Pa.
Crane Co.........Chicago.

Davenport Machine & Foundry Co.........Davenport, Iowa.
Dayton Oil Co.........Dayton, Ohio.
Debevoise-Anderson Co., Inc.........New York.
Delaware Tool Steel Corp.........Wilmington, Del.
Delta Oil Products Co.........Milwaukee.
Wm. Demmler & Bros.........Kewanee, Ill.
Despatch Oven Co.........Minneapolis
Detroit Electric Furnace Div., Kuhlman Electric Co.............
.........Bay City, Mich.
Detroit Sheet Metal Works.........Detroit.
DeWalt, Inc.........Lancaster, Pa.
Harry W. Dietert Co.........Detroit.
Dings Magnetic Separator Co.........Milwaukee.
Joseph Dixon Crucible Co.........Jersey City, N. J.
DoALL Co.........Des Plaines, Ill.
Dougherty Lumber Co.........Cleveland.
Durez Plastics & Chemicals, Inc.........North Tonawanda, N.Y.

Eastern Clay Products, Inc.........Jackson, Ohio.
Eastern Gas & Fuel Associates.........Boston.
Eastman Kodak Co.........Rochester, N.Y.
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corp.........New York.
Electro Refractories & Abrasives Corp.........Buffalo.
Exomet, Inc.........Conneaut, Ohio.
Exothermic Alloys & Service, Inc.........Chicago

Fabreeka Products Co.........Boston.
Fanner Mfg. Co.........Cleveland.
Federal Foundry Supply Co.........Cleveland.
Federated Metals Div., American Smelting & Refining Co.......
.........New York.
The Foundry, Penton Publishing Co.........Cleveland.
Foundry Educational Foundation.........Cleveland.
Foundry Equipment Co.........Cleveland.
Foundry Equipment Mfrs. Association, Inc.........Cleveland.
Foundry Facings Manufacturers Assn.........Pittsburgh.
Fox Grinders, Inc.........Pittsburgh.
Foxboro Co.........Foxboro, Mass.
Freeman Supply Co.........Toledo, Ohio.
Fremont Flask Co.........Fremont, Ohio.

General Electric Co., Chemical Div.........Pittsfield, Mass.
General Electric Co., X-Ray Dept.........Milwaukee.
General Grinding Wheel Corp.........Philadelphia.
General Refractories Co.........Philadelphia.
Girdler Corp., Thermex Div.........Louisville.
Globe Steel Abrasive Co.........Mansfield, Ohio.
Gray Iron Founders' Society.........Cleveland.
Great Lakes Carbon Corp.........St. Louis.
Great Lakes Foundry Sand Co.........Detroit.
Samuel Greenfield Co.........Buffalo.
Grindle Corp.........Markham, Ill.

Harbison-Walker Refractories Co.........Pittsburgh.
Harnischfeger Corp.........Milwaukee.
Benj. Harris & Co.........Chicago Heights, Ill.
Harrison Abrasive Div., Metals Disintegrating Co., Inc.........
.........Manchester, N.H.
Harrison Machine Co.........Wesleyville, Erie, Pa.
Hercules Powder Co.........Wilmington, Del.
Herman Pneumatic Machine Co.........Pittsburgh.
Hewitt-Robins, Inc.........New York.
Hickman, Williams & Co.........Philadelphia.
Hill & Griffith Co.........Cincinnati.
Hines Flask Co.........Cleveland.
Frank G. Hough Co.........Libertyville, Ill.
E. F. Houghton & Co.........Philadelphia.
Howard Foundry Co.........Chicago.
Hydro-Blast Corp.........Chicago.

Independent Pneumatic Tool Co.........Aurora, Ill.
Induction Heating Corp.........Brooklyn, N. Y.
Industrial Fabricating, Inc.........Eaton Rapids, Mich.
Industrial Minerals Co.........Lancaster, Ohio.

Ingersoll-Rand Co. . . . . New York.
International Graphite & Electrode Corp. . . . . St. Marys, Pa.
International Molding Machine Co. . . . . LaGrange Park, Ill.
International Nickel Co., Inc. . . . . New York.
Iron Age . . . . . New York.
Iron Lung Ventilator Co. . . . . Cleveland.

Jarrel-Ash Co. . . . . Boston, Mass.
Jeffrey Manufacturing Co. . . . . Columbus, Ohio.
William F. Jobbins, Inc. . . . . Aurora, Ill.
Johnson-March Corp. . . . . Philadelphia.
Joy Manufacturing Co. . . . . Pittsburgh.

Kelly-Koett Mfg. Co. . . . . Covington, Ky.
Kindt-Collins Co. . . . . Cleveland.
Andrew King . . . . . Narberth, Pa.
Lester B. Knight & Associates, Inc. . . . . Chicago.
H. Kramer & Co. . . . . Chicago.
Chas. A. Krause Milling Co. . . . . Milwaukee.
Kwik-Mix Co. . . . . Milwaukee.

Lava Crucible Co. of Pittsburgh . . . . . Pittsburgh.
R. Lavin & Sons., Inc. . . . . Chicago.
Leeco Products . . . . . Detroit.
Lindberg Engineering Co., Fisher Furnace Div. . . . . Chicago.
Linde Air Products Co. . . . . New York.
Link-Belt Co. . . . . Chicago.

Macklin Co. . . . . Jackson, Mich.
Macleod Co. . . . . Cincinnati.
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Manley Sand Co. . . . . Rockton, Ill.
Martin Engineering Co. . . . . Kewanee, Ill.
Master Pneumatic Tool Co., Inc. . . . . Cleveland.
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Mechanical Handling Systems, Inc. . . . . Detroit.
Michigan Smelting & Refining Div. of Bohn Aluminum & Brass Corp. . . . . Detroit.
Millward Alloys, Inc. . . . . Lockport, N. Y.
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Monk Tool Co. . . . . Geneva, Ill.
Monsanto Chemical Co. . . . . St. Louis.
The Moulders' Friend . . . . . Dallas City, Ill.
Mullite Refractories Co. . . . . Shelton, Conn.
Mystic Iron Works . . . . . Boston.

Nassau Smelting & Refining Co., Inc. . . . . Staten Island, N. Y.
National Carbon Co., A Division of Union Carbide & Carbon Corp. . . . . New York.
National Crucible Co. . . . . Philadelphia.
National Engineering Co. . . . . Chicago.
National Foundry Association . . . . . Chicago.
National Pigment Co. . . . . Philadelphia.
National Pulverizing Co. . . . . Millville, N. J.
Newaygo Engineering Co. . . . . Newaygo, Mich.
New England Coke Co. . . . . Boston.
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Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries . . . . . Buffalo.
Wm. H. Nicholls Co., Inc. . . . . Richmond Hill, N. J.
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Non-Ferrous Founders' Society . . . . . Chicago.
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Pekay Machine & Engineering Co. . . . . Chicago.
Peninsular Grinding Wheel Co. . . . . Detroit.
Pennsylvania Foundry Supply & Sand Co. . . . . Philadelphia.
Pennsylvania Glass Sand Corp. . . . . Pittsburgh.
Pennsylvania Pulverizing Co. . . . . Pittsburgh.
Penola Oil Co. . . . . Detroit.
George F. Pettinos, Inc. . . . . Philadelphia.
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Pittsburgh Crushed Steel Co. & Subsidiaries . . . . . Pittsburgh.
Pittsburgh Lectromelt Furnace Corp. . . . . Pittsburgh.
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Pyrometer Instrument Co., Inc. . . . . Bergenfield, N. J.
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H. H. Robertson Co. . . . . Pittsburgh.
Robinson Clay Products Co. . . . . Akron, Ohio.
Ross-Tacony Crucible Co. . . . . Philadelphia.
Royer Foundry & Machine Co. . . . . Kingston, Pa.

Safety Clothing & Equipment Co. . . . . Cleveland.
Safety First Shoe Co. . . . . Holliston, Mass.
George Sall Metals Co. . . . . Philadelphia.
Claude B. Schneible Co. . . . . Detroit.
A. Schrader's Son, Division of Scovill Mfg. Co. . . . . Brooklyn, N. Y.
Schramm, Inc. . . . . West Chester, Pa.
Scientific Cast Products Corp. . . . . Cleveland.
Semet-Solvay Div., Allied Chemical & Dye Corp. . . . . New York.
Severance Tool Industries, Inc. . . . . Saginaw, Mich.
Simonds Abrasive Co. . . . . Philadelphia.
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Smith & Richardson Mfg. Co. . . . . Geneva, Ill.
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Solvay Sales Div., Allied Chemical & Dye Corp. . . . . New York.
Specialloy, Inc. . . . . Chicago.
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Spo, Inc. . . . . Cleveland.
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Stamford Engineering Works . . . . . Stamford, Conn.
Standard Conveyor Co. . . . . N. St. Paul, Minn.
Standard Electrical Tool Co. . . . . Cincinnati.
Standard Horse Nail Corp. . . . . New Brighton, Pa.
States Engineering Corp. . . . . Ft. Wayne, Ind.
Steel Shot & Grit Co., Inc. . . . . Boston.
Steel Shot Producers, Inc. . . . . Butler, Pa.
Sterling Wheelbarrow Co. . . . . Milwaukee.
Frederic B. Stevens, Inc. . . . . Detroit.
Stewart-Warner Corp., Alemite Div. . . . . Chicago.
Sutter Products Co. . . . . Dearborn, Mich.
Swan-Finch Oil Corp. . . . . New York.

Tabor Manufacturing Co. . . . . Philadelphia.
Taggart Brimfield Co. . . . . Hammonton, N. J.
G. H. Tennant Co. . . . . Minneapolis.
Thiem Products, Inc. . . . . Milwaukee.
Tincher Products Co. . . . . Sycamore, Ill.
Titanium Alloy Mfg. Div., National Lead Co. . . . . New York.
Toledo Scale Co. . . . . Toledo, Ohio.

United Oil Mfg. Co. . . . . Erie, Pa.
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United States Rubber Co., Mechanical Goods Div. . . . . New York.
United States Graphite Co. . . . . Saginaw, Mich.
United States Gypsum Co., Industrial Div. . . . . Chicago.

Vanadium Corp. of America . . . . . New York.
Vesuvius Crucible Co. . . . . Pittsburgh.
Vonnegut Moulder Corp. . . . . Indianapolis.

Westover Engineers—Nomad Foundry Equipment Div. . . . . Milwaukee.
Whitehead Brothers Co. . . . . New York.
White Pine Lumber Co. . . . . Chicago.
Whiting Corp. . . . . Harvey, Ill.

Zanesville Sand Co. . . . . Zanesville, Ohio.

Technology ★

Bonding material for small castings

Surface tension bonds for sand

W. A. SNYDER / *Assistant Professor, M. E. Department, University of Washington*

Limited experiments have shown that it is possible to produce molding sand mixtures with suitable combinations of strength, permeability, and deformation for light molding, using only the surface tension of a fluid as a binder. The experiments outlined below show promise of leading to valuable basic facts on such surface tension bonds.

■ Molding sand bonds need not act over a great temperature range. If a bond useful through certain temperatures is destroyed at an elevated temperature, an overlapping bond could be introduced to take hold before the first is destroyed, thus extending the working range of the sand. Such procedure would involve the use of fluids, organic materials, and fusible bonds, singly or in combination.

As the starting point for an investigation into such bonds, the condition where green strength only is important was isolated. This condition exists where the casting is very small or has a thin section. With proper gating and pouring of such a casting, a solid skin of metal may form around the casting while the sand is still green. If this state exists, permeability can be very low, and the dry and high-temperature strengths of the sand can approach zero.

The surface tension of a fluid might be considered a nearly ideal bond for the stated conditions. Surface tension provides very little strength to coarse, uniform sand. However, as the grain size is decreased and the number of points of contact are increased, the strength resulting from the surface tension should increase.

To investigate the possible applications of surface tension bonds, several sand mixtures were prepared using fluids and semi-fluids as bonding agents. Crushed olivine was used as the aggregate in all tests. Table 1 shows the grain size of the two aggregates used in this series of experiments, Table 2 lists the mixtures prepared and gives properties of the mixtures.

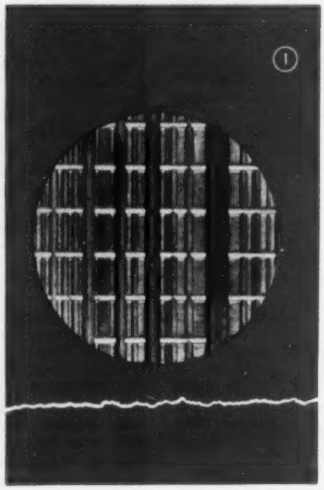


TABLE 1

U. S. Std. Screen	Aggregate A, %	Aggregate B, %
12	0	0
20	0	0
30	t	t
40	t	t
50	5.4	t
70	10.8	3.4
100	21.8	12.6
140	21.6	21.0
200	16.8	21.4
270	6.4	8.6
Pan	16.6	32.2
Total	99.4	99.2

Mixtures were prepared in a laboratory muller using a two-minute cycle; after the physical properties were determined, molds were produced and test castings poured. All castings had a 2½-in. pouring head. A. M. Nelson, research fellow, prepared surface roughness graphs from identical areas of each casting. The vertical scale of these graphs is 1 mm = 0.0001 in., and the horizontal scale is 1 mm = 0.0015 in. The equipment designed by Mr. Nelson for these tests utilized a head containing a thin beam with electrical resistance strain gages mounted on either side. As the head was moved over the specimen, the beam was deflected and the resistance of the strain gage circuit was altered. A given deflection of the beam is represented by a given point on the chart. The graphs shown represent actual enlargements of the surface condition and not simply a measure of its roughness. A general slope of the plotted line was obtained when it was not possible to level the sample under the test head.

The test pattern which was designed for this work is shown in Fig. 1. It has a diameter of 3 in. and a thickness of ½ in. The grooves on the face make it difficult to draw this pattern from a high green strength sand and, in addition, were intended to increase the possibility of sand wash.

Mixture 1 was prepared from 10 lb of aggregate A and 200 ml of 600 W oil, an extremely viscous worm gear lubricant; it featured a very low green strength and a high

deformation. It worked easily, and patterns could be drawn without rapping, giving very accurate reproduction. The sand displayed some stickiness and sand grains did adhere to the pattern; they were so small, however, that the resulting casting surface was excellent nevertheless. Figure 2 shows an aluminum alloy casting produced in this sand. The gate was slicked and may be assumed to represent the best surface that the aggregate is capable of forming.

There was a slight sand disturbance directly under the sprue, but it was no more pronounced than those normally obtained from conventional sands. Figure 3 shows an iron casting produced in this same molding material. The sand wash indicates that this molding material is not suitable for an iron casting of this size.

Mixture 2 was prepared by adding two lb of air-floated talc to 6 lb of mixture 1. As shown in Table 2, the permeability and deformation were greatly reduced and the green strength increased. This sand had no tendency to stick to the pattern; however, test castings were rougher because the permeability was too low to allow the metal to lie against the sand. Figure 4 shows an aluminum alloy casting produced with this sand. Very smooth castings could probably be produced by this sand if a greater pouring head were used.

The effect of grain size on properties of liquid-bonded sands is clearly shown by mixtures 1 and 2. From the results of these and other mixtures it was decided that an A.F.S. permeability number of 10 would give satisfactory results. Aggregate B, considerably finer than aggregate A, was prepared for further experiments.

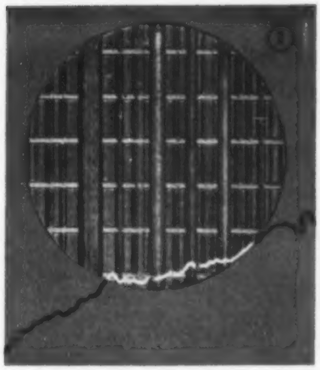
Water was used as the bonding agent for mixtures 10 through 14. The moisture content was varied from 3.2 to 6.2 per cent. Permeability was not affected by the moisture content within the range tested. Green compression strength and deformation increased with increasing moisture content.

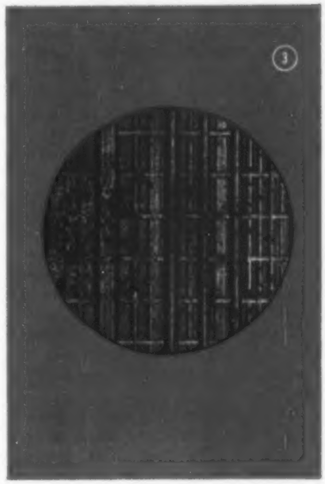
Sands in this group all displayed excellent working properties; however, mixture 11 was selected as the most desirable. All of these mixtures displayed some stickiness when rammed against the metal pattern, but none stuck to wood patterns. Mixture 14 was similar to mixture 11, with the mulling time increased to five minutes. The sharp increase in strength indicates that the two-minute mulling time used for other mixtures was not the optimum time when water was used as a bond. The other bonds tested did not show appreciable increases in strength with increased mulling time.

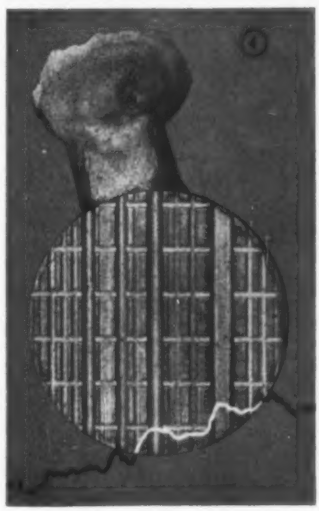
Figure 5 shows aluminum alloy castings produced in molds made from mixture 10, containing 3.2 per cent moisture. Figure 6 shows similar castings from molds made with mixture 13, containing 6.2 per cent moisture. The surfaces of the collar castings produced from a wood pattern appear to be equally good; however, the mixture with the lower

TABLE 2

Mixture Number	Aggregate Type	Weight, Pounds	Oil, cc	Water, cc	Grease, cc	Permeability, A.F.S. units	Green Comp., psi	Deformation, in./in.
1	A	10	200			19	1.8	0.040
2	Six lb Mix 1 plus two lb air-floated talc					2	5.0	0.024
10	B	10		150		11	3.3	0.019
11	B	10		200		11	4.0	0.021
12	B	10		250		11	4.5	0.024
13	B	10		300		11	4.6	0.024
14	B	10		200		11	5.7	0.019
15	B	10			100	7	1.8	0.016
16	B	10			200	7	2.8	0.027
17	B	10		100	200	7	3.5	0.027
18	B	10	100			8	2.3	0.016
19	B	10	150			10	3.0	0.017
20	B	10	200			9	4.1	0.021
21	B	10	200	100		7	5.5	0.018







moisture produced a better surface on the test plate.

Figures 7 and 8 show iron and brass castings poured in molds made from mixture 14. The surfaces are good but, as the graphs indicate, are not the equivalent of the aluminum alloy castings. It is interesting to note that brass and iron could be poured in these sands without cutting or washing. The high latent heat of vaporization of water is probably instrumental in making this possible.

Cup grease was used as a bonding material in mixtures 15 through 17. This is not a surface tension bond. It is similar to the other bonds used in that it provides no dry strength. The grease forms a gelatinous coating around each sand grain and is not drawn into a fillet by surface tension between contacting grains, as is the case with liquid bonds. The distribution of this semi-fluid in the rammed sand may partly explain the lowered permeability of the sands bonded with this material.

The grease-bonded sands had lower permeability, lower green compression strength, and higher deformation than sands bonded with equivalent volumes of water. Strength and deformation increased with increasing bond. Mixture 17 shows that the addition of water will sharply increase the compression strength without materially affecting the deformation or permeability.

An aluminum alloy casting poured in a mold of mixture 16 is shown in Fig. 9. The test plate casting, although marred near the gate by a few sand grains that washed from the pouring basin, had the finest surface of any of the castings produced in this series of experiments. This casting showed a very fine appearance to visual inspection; but, more important, the roughness graph showed the surface to be an excellent reproduction of the pattern surface. The surface of this casting may be attributed to the fact that the sand displayed no tendency to stick to the pattern.

Mixture 17 did stick slightly, and roughness graphs of castings made in this sand showed sharp deflections due to dislodged sand grains as well as excessive back pressure. Judged by normal criteria, however, the surfaces were good.

The final bond tested with aggregate B was 600 W oil. Mixtures 18 through 21 contained this material. This liquid has a higher viscosity than water but a lower surface tension. Comparing the properties of mixture 14 with those of mixture 20, it would appear that the surface tension of the fluid has a greater effect on the strength than does the viscosity. The properties of these mixtures followed the same general pattern as those of water-bonded sands with strength, deformation, and stickiness increasing with increasing bond. Examination of the

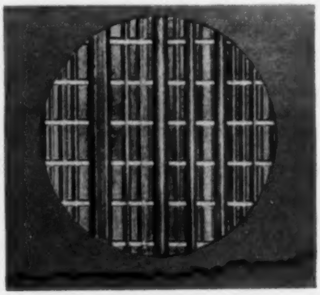


Fig. 5 . . . Aluminum alloy casting produced in sand mixture 10.

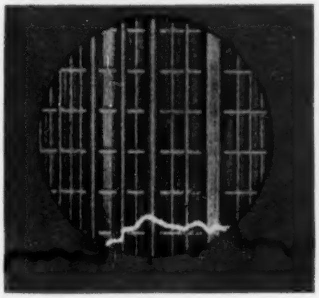


Fig. 6 . . . Aluminum alloy casting produced in sand mixture 13.

properties of mixture 21 shows that the addition of water to an oil-bonded sand will sharply increase the strength without materially affecting the deformation. The best cast surface was obtained with mixture 20, containing 200 ml of oil, the volumetric equivalent of 4.22 per cent water. This material produced an excellent surface but, as in the case of many mixtures, minute grains of sand adhered to the pattern. A surface roughness graph of a casting produced in this material is shown in Fig. 10.

These experiments show that it is possible to produce green molding materials with suitable combinations of strength, permeability, and deformation for light molding, using only the surface tension of a fluid as a binder. The process of increasing the green strength of a fluid-bonded mixture by decreasing the grain size has, of course, been used for many years in preparing oil-bonded core sands. The extent to which this control can be exerted, however, is emphasized by comparing the properties of mixtures 1 and 2. The addition of fines in this case

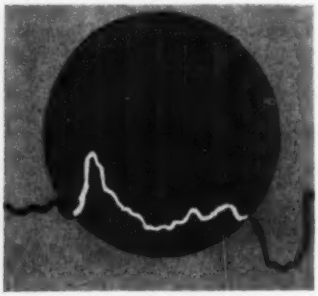


Fig. 7 . . . Gray iron casting produced in water-bonded sand molds.

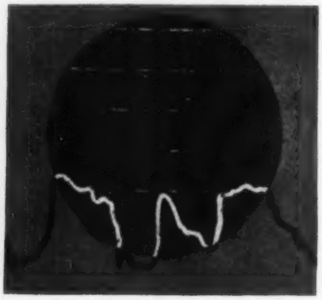


Fig. 8 . . . Brass castings produced in water-bonded sand molds.

raised the compression strength from 1.8 to 5.0 psi. This addition also reduced the deformation to a value that is generally considered satisfactory.

Without changing the grain size of the aggregate, both strength and deformation are increased as the volume of liquid bond is increased. It appears, however, that adding two immiscible fluids with different surface tensions increases the strength without necessarily increasing the deformation.

It is interesting to note that of all the bonds added to aggregate B, the best castings were obtained when the volume of bond was 200 ml to 10 lb of dry aggregate. All mixtures rammed to a smooth surface with very little effort; ramming consisted

mainly of pushing the sand into place. The grease-bonded sands, although the weakest, required the most careful ramming, since this bond has a tendency to form soft conglomerate masses. The conventional flowability test was of no value in comparing these sands since they all rammed to a dense surface with only a fraction of the energy

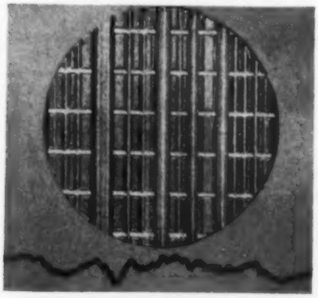


Fig. 9 . . . Aluminum alloy casting produced in grease-bonded sand mold.

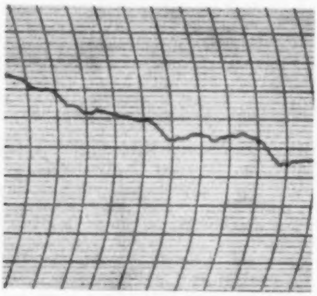


Fig. 10 . . . Roughness graph of aluminum alloy from oil-bonded sand mold.

supplied by one drop of the A.F.S. standard rammer.

Many natural, fine-grained sands form hard conglomerates or clay balls unless they are carefully handled. Once formed, these conglomerates are difficult to break down and sometimes must be riddled out of the heap. When the sands described in this paper are employed, the formation of hard lumps of any type is impossible; therefore the reconditioning of such sands is a relatively simple task.

When oil-bonded sand is employed, the only reconditioning required is riddling to remove the soft skin of sand formed around the casting. This skin will remix readily; but if this is done, the sand will eventually become too plastic and will require the addition of water to reduce the deformation. The temper of oil-bonded sands does not change in storage, and they may be mixed and set aside for several months without any measurable change in properties. It is assumed that grease-bonded sands will behave in a similar manner when stored, although they were not tested in this way. The possibility of storing tempered sand should appeal to pattern shops. Such properties would also simplify the design and operation of an automatic molding and pouring machine.

The ability of these sands to withstand the forces set up by flowing metal without cutting or washing is rather intriguing. Using a water-bonded sand, aluminum alloy castings weighing several pounds were poured through a single gate without any indication of sand washing either in the gate or in the casting. It is probable that the reduced skin friction brought about by the smooth surface these sands offer to the metal is instrumental in preventing wash.

Effects of gating

The particular gating systems used had no effect on sand wash. When sand wash did occur, it could not be eliminated by changing the gating. The poor gating systems used in some cases caused oxide folds on some aluminum castings but did not cause washing.

Cutting and washing will occur if the bond is dissociated or evaporated before pouring is complete. The time required to pour a casting and the amount of heat that the bond can absorb without being destroyed are important factors in preventing sand wash. When iron is poured in an oil-bonded sand, a flame appears at the sprue almost immediately, and examination of the casting will show severe washing. Water-bonded sands, because of the high latent heat of vaporization of the bond, will successfully produce iron castings.

The use of olivine aggregate is considered to have been a contributing factor to the success of these tests, first because of the fortunate shape of finely crushed olivine with an almost complete absence of plates and slivers, and second, because of the high density and specific heat of this material. Further, in the interest of health it appears wise to avoid the use of silica when these fine-grained aggregates are used.

So far, experiments have been rather limited in scope; the results, however, are more encouraging than was originally anticipated. Determination of the effects of finer aggregates and other bonding fluids seems to provide a promising field for further research. All tests and related work described were performed in the foundry laboratories at the University of Washington where, under the supervision of Prof. Gilbert S. Schaller, olivine-based molding sand has been used exclusively for more than a year.

▶ ***See record apprentice contest***

■ One dozen A.F.S. chapter contests, largest number in A.F.S. history, have been held this year in preparation for the National Judging of the 1952 A.F.S. Apprentice Contest.

Three A.F.S. chapters—Birmingham District, Metropolitan and Canton District—are participating for the first time, while nine others have again submitted entries. They are: Southern California, St. Louis District, Northern Illinois—Southern Wisconsin, Wisconsin, Detroit, Northeastern Ohio, Michiana and Eastern Canada with its two concurrent contests at Montreal and Three Rivers.

In addition to the record number of chapter contests, an unprecedentedly large number of plants have conducted their own contests and will submit their top entries to the National Judging, to be held on or about April 1 at the University of Illinois' Navy Pier Branch, Chicago.

Judges will be selected shortly by Roy W. Schroeder, University of Illinois, Navy Pier Branch, Chicago, chairman of the A.F.S. Apprentice Contest Committee.

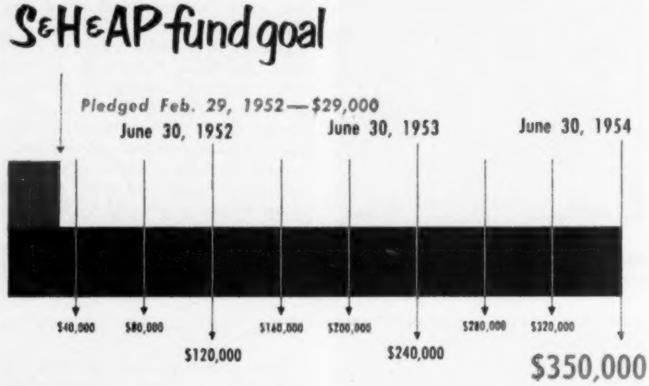
The contest, which closed March 15, comprises five divisions—Gray Iron Molding, Steel Molding, Non-Ferrous Molding, Wood Patternmaking, and Metal Patternmaking.

Winning chapter and in-plant contest winning entries must be shipped immediately to Prof. Roy W. Schroeder, Department of Mechanical Engineering, Room 72, University of Illinois, Navy Pier Branch, Chicago, so as to arrive not later than midnight of March 28.

First prize winners in each of the five Contest divisions will receive round trip rail and Pullman fare to and from the 1952 A.F.S. International Foundry Congress & Show in Atlantic City, May 1 through 7. During the Society's Annual Business Meeting, the five top winners will each receive a cash prize and certificate from A.F.S. National President Walter L. Seelbach.

Small foundries lead way in supporting

Long-range S & H & AP program



■ In a period of less than six weeks from the inception of fund solicitation for the A.F.S. Safety & Hygiene and Air Pollution Program, over 100 companies pledged an amount exceeding $30,000. Surprisingly, in view of the particular importance of the program to the larger foundry operators, a majority of the contributions to date have come from small and medium size plants.

From every corner of the United States and Canada interest in the work is constantly increasing. With a goal of $35,000 for a minimum 10-year program, it is hoped that the entire essential sum may be contributed within the three-year period ending June 30, 1954. Thus the goal for June 30 of the current year is $120,000.

Program under way

The importance of the work has been emphasized at numerous Chapter meetings of foundry management and in consultations with individual plant operators. A conference on *"Health Protection and Foundry Practice"* has been developed with the University of Michigan, School of Public Health and will be held at Ann Arbor, Mich., on April 11-12. The Society's "codes" of recommended practice are being revised and brought up to date.

NCC members assist

Credit for the surprising number of contributions to date rightfully belongs to the trade associations of the foundry industry who are members of the National Castings Council. At the voluntary request of this group, the original solicitation was made by the following: Gray Iron Founders' Society, Malleable Founders' Society, National Foundry Association, Non-Ferrous Founders Society, Foundry Equipment Manufacturers' Association, Foundry Facings Manufacturers' Association and Steel Founders' Society of America.

This splendid cooperation indicates industry-wide interest in the purposes of the Safety & Hygiene and Air Pollution Program. The announced basis of contribution enables every foundry, no matter how small, to participate and advance the work. The American Foundrymen's Society, in expressing appreciation for the initial work of the trade associations, will now "carry the ball" to complete the job. In doing so, A.F.S. at this time requests the fullest support of foundry management in reaching the goal of $350,000.

The castings industry must assume leadership in developing its own standards of working conditions. A.F.S. believes that the industry will assume this obligation in the fullest measure.

Companies who have pledged and contributed to the Safety & Hygiene and Air Pollution Program to date include the following:

S & H & AP Contributors to February 29, 1952

The Acme Foundry & Machine Co., Coffeyville, Kansas.
Alloy Steel & Metals Co., Los Angeles.
Altens Foundry & Machine Works, Inc., Lancaster, Ohio.
Aluminum Match Plate Corp., Kenmore, N. Y.
American Chain & Cable Co., York, Pa.
American Air Filter Co., Louisville, Ky.
American Malleable Castings Co., Marion, Ohio.
American Manganese Bronze Co., Philadelphia.
American Skein & Foundry Co., Racine, Wis.
American Steel Foundries, Chicago.
Ampco Metal, Inc., Milwaukee.
Anstice Co., Rochester, N. Y.
Arwood Precision Casting Corp., Brooklyn, N. Y.
Badger Malleable & Mfg. Co., South Milwaukee, Wis.
Barclay Foundry Inc., Milwaukee.
Beckett Bronze Co., Muncie, Ind.
B.F.S. Bronze Co., Brooklyn.
Bound Brook Oil-less Bearing Co., Bound Brook, N. J.
Brillion Iron Works, Inc., Brillion, Wis.
Builders Iron Foundry, Providence, R. I.
Burnside Steel Foundry Co., Chicago.
Cadillac Malleable Iron Co., Cadillac, Mich.
Canton Malleable Iron Co., Canton, Ohio.
Carondelet Foundry Co., St. Louis.
Central Specialty Division of King-Seeley Corp., Ypsilanti, Mich.
Chain Belt Co. of Milwaukee, Milwaukee, Wis.
Compton Foundry, Compton, Cailf.
Crouse-Hinds Co., Syracuse, N. Y.
Curto-Ligonier, Ligonier, Ind.

Dalton Foundries, Inc., Warsaw, Ind.
Dayton Malleable Iron Co., Dayton, Ohio.
Decatur Casting Co., Decatur, Ind.
Deemer Steel Casting Co., New Castle, Del.
Dixie Bronze Co., Birmingham, Ala.
Duriron Co., Dayton, Ohio.
East Birmingham Bronze Foundry Co., Birmingham, Ala.
East St. Louis Castings Co., East St. Louis, Ill.
Eastern Malleable Iron Co., Naugatuck, Conn.
Eaton Manufacturing Co., Vassar, Mich.
Electric Steel Castings Co., Indianapolis, Ind.
Engineering Castings, Inc., Marshall, Mich.
Farrell-Cheek Steel Co., Sandusky, Ohio.
Federal Malleable Co., West Allis, Wis.
Florida Machine & Foundry Co., Jacksonville, Fla.
Forest City Foundries Co., Cleveland.
General Foundries Co., Milwaukee.
Gillett & Eaton, Inc., Lake City, Minn.
J. E. Gilson Co., Port Washington, Wis.
Goldens Foundry & Machine Co., Columbus, Ga.
Hamilton Foundry & Machine Co., Hamilton, Ohio.
Arthur Harris & Co., Chicago.
Hays Manufacturing Co., Erie, Pa.
Herman Pneumatic Machine Co., Pittsburgh.
Hoosier Iron Works, Kokomo, Ind.
Induction Steel Castings Co., East Detroit, Mich.
Inland Lakes Foundry Co., Cadillac, Mich.
Iron Lung Ventilator Co., Cleveland.
Jamestown Malleable Iron Corp., Jamestown, N. Y.
Kencroft Malleable Co., Inc., Buffalo.
Key Company, East St. Louis, Ill.
Kirsh Foundry, Inc., Beaver Dam, Wis.
Lawran Foundry Co., Milwaukee.
Link-Belt Co., Philadelphia.
Littlestown Hardware and Foundry Co., Littlestown, Pa.
Locomotive Finished Material Co., Atchison, Kansas.
H. C. Macaulay Foundry Co., Berkeley, Calif.
Malleable Iron Fittings Co., Branford, Conn.
Clayton Mark & Co., Evanston, Ill.
Michigan Malleable Iron Co., Detroit.
Michigan Steel Casting Co., Detroit.
Mid-City Foundry Co., Milwaukee.
Millinocket Foundry & Machine Co., Millinocket, Me.
Minster Machine Co., Minster, Ohio.
Motor Castings Co., West Allis, Wis.
Newton Foundry Co., Newton, Iowa.
Nonferrous Foundries, Inc., Indianapolis, Ind.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Ohio Steel Foundry Co., Lima, Ohio.
Parker Sweeper Co., Springfield, Ohio.
Paxton-Mitchell Co., Omaha, Neb.
Pelton Steel Castings Co., Milwaukee.
Penn Steel Castings Co., Chester, Pa.
Plainville Casting Co., Plainville, Conn.
Pullman-Standard Car Manufacturing Co., Butler, Pa.
Pusey and Jones Corp., Wilmington, Del.
J. F. Quest Foundry Co., Minneapolis.
Racine Aluminum & Brass Foundry, Racine, Wis.
T. Shriver & Co., Inc., Harrison, N. J.
Sibley Machine & Foundry Corp., South Bend, Ind.
Superior Foundry, Inc., Cleveland.
Swayne, Robinson & Co., Richmond, Ind.
J. H. Taylor Foundry, Inc., Quincy, Mass.
Texas Foundries, Inc., Lufkin, Texas.
Textile Machine Works, Reading, Pa.
Thunder Bay Manufacturing Corp., Alpena, Mich.
Thys Company, Sacramento, Calif.
Union Manufacturing Co., Boyertown, Pa.
United Bronze Corp., Detroit.
Universal Foundry Company, Oshkosh, Wis.
Washington Iron Works, Seattle.
West Michigan Steel Foundry Co., Muskegon, Mich.
West Point Foundry & Machine Co., West Point, Ga.
Whiting Corp., Harvey, Ill.

▶ *Foundry health conference*

■ Health protection in foundry practice will be studied April 11 and 12 at a conference planned by and for foundrymen. Sessions will be held in the auditorium of the School of Public Health building, University of Michigan, Ann Arbor. Conference planners and speakers are paying particular attention to measures readily applicable in small foundries.

Dust control will be covered in a series of talks and discussion periods the first day of the conference, the day concluding with demonstrations in the University of Michigan teaching foundry. The second day, the conference will be divided to enable one group to concentrate on ferrous foundry problems, the other to study non-ferrous problems. The meetings will conclude with a session summarizing the work of both groups.

Sponsors of the conference, in addition to the School of Public Health and the American Foundrymen's Society, are the Michigan and the Detroit Departments of Health and the University's Production Engineering Department. Heading the Planning Committee is William G. Frederick, Detroit Department of Health and lecturer in the School of Public Health.

While designed primarily for foundry operators, the conference is open to all. Enrollment fee is $10.00; applications for enrollment should be sent to H. E. Miller, School of Public Health. Those who complete the course will receive an official "Record of Attendance." Rooms are available at the Michigan Union on the campus. Room applications for the Union should mention attendance at the conference.

Program for the conference starts with registration at the School of Public Health, 8:00-9:00 a.m., Friday, April 11. Program details follow.

Friday, April 11

9:00 a.m.—Introduction. Henry F. Vaughan, School of Public Health.
9:15 a.m.—Keynote Address. A. C. Hensel, Albion Malleable Iron Co., Albion, Mich.
9:45 a.m.—"*Nature of Disease Caused by Dust*," Oscar A. Sander, consultant, Milwaukee.
10:45 a.m.—Recess.
11:00 a.m.—"*Measurement of Dust in Foundries*," Donald Van Farowe, Michigan Department of Health, Lansing.
11:45 a.m.—Discussion.
12:15 p.m.—Adjournment for lunch.

CONTROL OF DUST

1:30 p.m.—"*Housekeeping*," Herbert J. Weber, American Brake Shoe Co., Chicago.
2:30 p.m.—"*Isolation, Substitution and Wetting Agents*," Edward Meiter, Employers Mutual Insurance Co.
3:00 p.m.—Recess.
3:30 p.m.—"*Respirators*," A. Kamaila, Detroit Department of Health.
4:00 p.m.—"*Ventilation*," William N. Witheridge, General Motors Corp., Detroit.
5:00 p.m.—Afternoon session adjourns.
7:30 p.m.—Demonstrations. University of Michigan Teaching Foundry. Orlan W. Boston and staff.
Movies. Otto Tod Mallery, Jr., University of Michigan.

Saturday, April 12

FERROUS FOUNDRY PROBLEMS

8:30 a.m.—"*Sand Handling*," Claude B. Schneible, Claude B. Schneible Co., Detroit.
9:00 a.m.—"*Coremaking and Molding*," George Tubich, Michigan Department of Health, Lansing.
9:30 a.m.—"*Melting and Pouring*," John Radcliffe, Ford Motor Co., Dearborn, Mich.
10:00 a.m.—Discussion.
10:30 a.m.—Recess.
10:45 a.m.—"*Shake-out and Core Knock-Out*," John M. Kane, American Air Filter Co., Louisville, Ky.

continued on page 65

Shielded arc welding process saves defective copper molds

Welding the voids found when machining water-cooled copper molds saves their being scrapped and eliminates the waste of previous production steps. The particular arc welding process employed uses a consumable electrode shielded by argon. No flux is required, resulting in the formation of welds with a high purity. Process can be used on practically all commercial metals.

E. H. FRAIL / *Linde Air Products Co., Union Carbide & Carbon Corp., N. Y.*

▪ Air bubbles trapped during casting produce voids in some of the 2½-ton copper molds being made by an eastern foundry. Existence of these defects can not be detected until the mold is machined, since the voids are surrounded by metal as cast. When machined, however, small pinholes warn of larger pockets beneath the machined surface.

A commercially pure grade of oxygen-free copper for sheets is cast in these copper molds. When this copper is being poured, the molds are cooled by water circulating through a drilled-out compartment. The copper may burn through the thin shell surrounding a large air pocket, with a resultant explosion.

Until recently, all molds found defective were thrown back into the reverberatory furnace, and all the costly production steps were wasted. Now, holes are drilled in the mold to get to the bottom of the voids. Copper deposited into the drilled-out voids followed by a small amount of finishing and cleaning produces a practically homogeneous mold.

Defective cast copper mold prior to repair by welding. The three large drillings at left show what pinholes on the surface may indicate — large air pockets.

Completed deposition of copper into an air pocket. At far right of the new deposit is a finished weld. Excess copper has been removed and surface machined.

Other processes failed

Various arc welding methods were unsuccessful due to undercutting the weld deposit. When the deposits were ground, there was a concave section around the weld. Oxy-acetylene methods were unsatisfactory due to excess heat caused by preheating the mold, which could not be localized on copper. The heat caused undue discomfort to the welder.

The successful welding process uses a consumable electrode which is supplied as a continuous coil of metal wire. An arc is maintained in a shield of argon gas between the metal electrode and the work-piece. The electrode is deposited as filler metal across the arc into the weld. Since no flux is used, welds are of a high purity. High rate of metal deposition, low cost, and high weld zone cooling rate are among the other features. The process is applicable to either hand or machine welding, and can be used on practically all commercial metals.

Aluminum, copper, stainless steel, carbon steels, magnesium, nickel, lead, cast iron, various high-temperature alloys, and titanium are typical. Welding process has been used for thicknesses up to 1½ in. on aluminum and copper alloys, stainless steel, and other such metals.

Pressure casting aluminum

■ "Castings to make castings" is the business of Scientific Cast Products Co., Cleveland and Chicago producers of aluminum matchplates, pattern castings, cope and drag plates, core boxes and driers. The Chicago plant, shown in the accompanying photographs, is a highly specialized and compact operation employing some 25 men to carry out the nine major steps that go into the manufacture of cast aluminum patterns and matchplates.

These steps are: (1) planning the job, (2) making the match, (3) pouring of individual cope and drag plaster molds, (4) trimming and scoring individual molds, (5) combining individual plaster molds into multi-patterned matchplate molds, (6) mold baking, (7) pouring aluminum, (8) knockout, and (9) rough finishing matchplates and castings.

Illustrated in this article are these steps as applied to the manufacture of a loose casting pattern. These patterns, although cast by a similar method to that employed in making matchplates, are ultimately used in hand molding, rather than in machine molding.

Shown in the photographs on these pages are the successive production stages in making a loose casting pattern to be used by apprentices competing in the Gray Iron, Steel and Non-Ferrous Molding Divisions of the 1952 A.F.S. Apprentice Contest. Since some 20 patterns are needed for distribution to various chapter and in-plant contests held in preparation for the national judging, the cost of wood patterns would be prohibitive. Instead, Scientific Cast Products Co. offered to make metal contest patterns free of charge.

Plans for the contest pattern, in this instance a pattern for a housing, were submitted by A.F.S., together with a wooden pattern.

Next, the matchmaker outlined the pattern on a plaster block and established the location of dowel pins, later used to hold the cope and drag

Fig. 1 . . . A.F.S. Apprentice Contest pattern is first placed on plaster block made on surface plate, is then clayed-up to parting line.

Fig. 2 . . . Angle bars are placed around block, forming pouring box. Plaster is poured over pattern to form the match and covering plaster block removed.

Fig. 3 . . . After clay is removed from pattern and match, cavity is smoothed out and finished in preparation for mold duplication, using the original match.

→

Fig. 4 . . . Drag mold is coated with oily parting, then placed in a box formed by four thick angle bars in preparation for pouring the cope.

molds in alignment. He then filled in the pattern cavities with modeling clay (Fig. 1). If the pattern had not been a flatback, the plaster block would have been gouged out so as to permit pattern to be sunk to depth of parting line, and the cavity filled with clay.

Four thick metal angle bars were next placed around the sides of the plaster block, forming a pouring box, and plaster was poured to a depth of 1½ in. over the pattern to form the match, or drag mold.

After the mold hardened, it was inverted, the covering plaster block (Fig. 2) taken off and the clay removed from the pattern and match. The cavity was then smoothed out. (Fig. 3).

After coating the match with oily parting (Fig. 4), metal angle bars were placed around its periphery to form a pouring box, and the match given a second coat of parting.

Carefully mixed plaster (Fig. 5), agitated to remove air bubbles, was poured to form the cope mold (Fig. 6) and allowed to dry for at least 15 minutes.

While the cope mold was setting a thin wire was pushed through to the parting line. After the plaster dried, the wire was withdrawn and low air pressure applied to the hole, splitting the cope and drag apart.

Pouring mold sets

The original cope and match then were used as molds to pour as many sets of individual cope and drag molds as would ultimately be required. In the case of the A.F.S. Apprentice Contest pattern, 20 sets of plaster-molds were poured.

Locating pins were put in at this stage for alignment of copes and drags later in the operation.

Next, individual cope and drag molds were trimmed with a large knife, allowing them to be placed

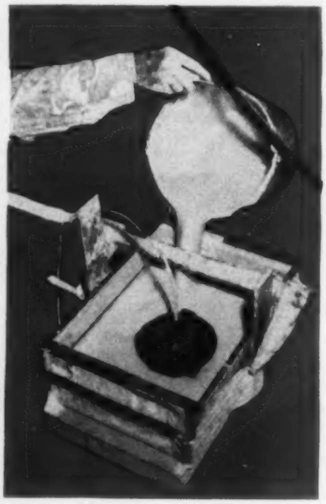


Fig. 5 (Top left) . . . Plaster compound used in making molds for pressure-cast aluminum patterns and matchplates is carefully weighed before mixing with correct proportion of water.

Fig. 6 (Above) . . . Plaster is poured over pattern, agitated to remove air bubbles and allowed to set. Cope and match are separated by pushing a wire through plaster to parting line and withdrawing it so that air pressure can be used to force them apart.

Fig. 7 (Left) . . . Molds are placed in steel frames and plaster is poured around them, binding cope and drag molds into position.

closely together in frames. The molds were then scored deeply along the sides and the mold bottoms cut back. In the next operation, this permitted liquid plaster to flow into the grooves. When the plaster set, it held the molds securely within the frames.

A steel top table was then sprayed with parting compound and a large metal drag frame placed on it, parting side down. Individual plaster drag molds were then laid within the large drag frame, parting side down. The molds were then weighted and plaster poured into the large drag mold frame.

As soon as the plaster had set sufficiently that it could support its own weight, the entire drag frame was inverted and sprayed with oily parting.

Individual copes were aligned atop their mating drags by means of dowel pins, and the cope frame set over the drag frame. Individual cope frames were weighted and plaster poured over them and allowed to set (Fig. 7).

Cope and drag were separated by the wire hole-air pressure method. The cope was removed, locating pins taken out, and the holes filled with plaster. At this point, sprues, runners and gates were cut into the plaster in accordance with customer specifications.

Drag and cope molds were smoothed out and chills placed wherever there were heavy sections.

Next, the molds were placed on racks (Fig. 8) and put into a gas oven to bake for about 12 hours at 400 F to remove moisture.

Baked molds, as exemplified by Fig. 9, were then ready for pouring. Cope and drag were put together in a special pouring stand capable of exerting 4,000-lb pressure.

An asbestos disc was placed on top of the sprue (Fig. 10). Molten aluminum was poured into a holding cylinder (Fig. 11), the cylinder was capped and air pressure applied.

When the air pressure reached 2 psi, the asbestos disc broke, shooting metal into the mold (Fig. 12). Air pressure was then increased to 5 psi, completing the pouring. Mold was unclamped and set out to cool.

The casting knockout was accom-

Fig. 8 (Above) . . . Workmen placing solid frames containing molds on rack to await drying in gas oven.

Fig. 9 (Top right) . . . Example of a completed mold. Note gating layout and placement of aluminum chills for heavy casting sections.

Fig. 10 (Center right) . . . Asbestos disc placed between sprue and metal-holding cylinder holds back metal until 2 psi air pressure is applied, then breaks and shoots metal into the mold.

Fig. 11 (Lower right) . . . Pouring molten aluminum into cylinder which holds metal until slight air pressure forces it into mold.

plished by rapping the plaster mold with a sledgehammer. The plaster was of no further use.

Gates and sprues were removed with a band saw, rough edges smoothed with a mill file, and the pattern casting was ready for final inspection. To meet "foundry finish" specifications, the dimensions of the cast aluminum pattern had to coincide with those of the original wood pattern. In castings where cores are used to lighten the casting, holes are drilled at this stage and core sand removed. Holes are plugged, the surface is restored and the cast aluminum pattern is ready for final shipment.

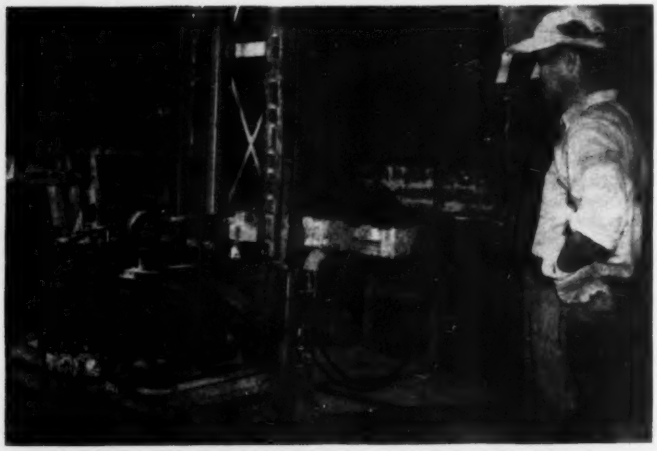


Fig. 12 . . . Holding cylinder is capped and air pressure is applied, shooting metal into the mold.

Matchplate making

Procedure for making matchplates varies only slightly from the above-described operation for making cast patterns.

First step in matchplate production involves layout and planning. A specification sheet is sent to the customer, who indicates the desired type of flask pin hole, type of ear, length, width and thickness of plate.

The buyer also provides a pattern made, in order of preference, of brass, white metal, aluminum, cherry wood, mahogany or white pine. He also indicates the layout of the matchplate on the back of the specification sheet and, preferably, the location of gates, runners and risers.

The rest of the operation is similar to that of making cast patterns, except that at the stage corresponding to that shown in Fig. 7, a spacer that allows for the thickness and shape of the matchplate (varying from ⅜ to ¾ in.) is placed between the cope and drag frames before the mold is poured.

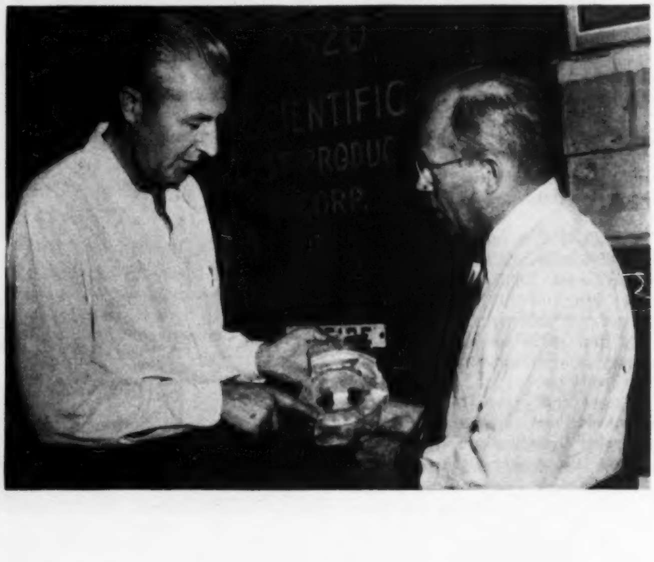
The rough-finished 1952 A.F.S. Apprentice Contest molding patterns shown on these pages were next sent to City Pattern & Foundry Co., South Bend, Ind., where Contest Committee Vice-Chairman George Garvey supervised their finishing.

Next, the finished pattern castings were sent to A.F.S. Headquarters for distribution to chapter and in-plant contests. Of the 20 patterns, three went to G. Ewing Tait, Dominion Engineering Works, Montreal, who supervised their distribution to Canadian chapters.

Balance of the 20 castings was routed to the nine U. S. chapters and numerous firms conducting local apprentice contests.

Fig. 13 . . . Knocking casting out from plaster frame. Gates and risers are then removed from casting, completing the process to "foundry finish" specifications.

Fig. 14 . . . Plant manager Otto Harer (left) shows completed metal contest pattern to Roy W. Schroeder, chairman of A.F.S. Apprentice Contest Committee.



Wash development "Down Under"

Magnesite for molding

S. G. URANE / *Foreman, Broken Hill Proprietary, Ltd., Melbourne, Australia*

Job-tested experiments have shown that magnesite can replace silica flour as a general mold and core wash and in treating facing sand to reduce its permeability. This paper tells how to prepare the magnesite, describes properties, compounding techniques, and application methods for the wash, gives typical facing sand mixtures, and offers helpful suggestions on sound practice.

Magnesite wash is successfully used on rolls of all sizes in weights to 31 tons.

Molder is applying magnesite wash with a brush to insides of bloom roll mill.

■ Satisfactory results have been obtained over a number of years with the substitution of finely ground magnesite for silica flour in three foundry applications. As a result of experiments carried out with various materials not containing free silica, magnesite has totally replaced silica flour as a general core and mold wash, and in reducing the permeability of core and mold facing sand.

Iron-free magnesite is calcined at about 1630 C (2966 F). Calcined magnesite of an analysis

SiO_2	5.35%
Al_2O_3	1.31%
Fe_2O_3	0.55%
CaO	3.42%
MgO	84.97%
Ignition Loss	4.57%

is charged dry into a ball mill where it is ground for eight hours to give the desired fineness of at least 80 to 90 per cent through 200 mesh.

Wash constituents

The core and mold wash is made of 85 lb calcined magnesite flour, 1¾ lb core gum or dextrin, and 3½ lb western bentonite. These ingredients are first mixed dry to distribute the bentonite, which prevents clotting, and then placed in an air-agitated mixer where water is added to give a hydrometer reading of 62 Twaddell (34 Baume). The wash keeps well in suspension, it is easy to apply, and successive coatings can be applied without fear of spalling either in the drying of the mold or during casting.

Application varies according to the type of mold. For general castings, the core or mold face to be painted is first roughened by rubbing with a piece of burlap, and then skin-dried to allow the wash to soak in and thus close up the spaces between the sand grains on the face.

The first coat should be slightly thinner than the succeeding coats in order for it to soak in. Time should be allowed between each coat for it to become air-dried. A gas flare may be used if desired. It may be practical to paint the molds after drying and while still warm enough to dry the wash. Two applications are usually enough, but successive coats may be added at the discretion of the molder.

Use with loam molds

Loam molds should be strickled to the required shape and then thor-

oughly dried. A slurry composed of a facing sand containing over 95 per cent silica and with characteristics

Soft Point	2952 F
Fusion	3027 F
A.F.S. Grain Shape	Angular
A.F.S. Clay Content	7.00%
A.F.S. Grain Size	42
Ignition Loss	0.90%

plus a 20 per cent addition of calcined magnesite flour is thoroughly mixed and then rubbed well into the dried mold surface. The mold is then strickled off, leaving a film of the slurry. It is dried, finished off, and painted.

For heavy castings such as mill housings, stern frames, and presses,

At left is shown a steel-base alloy roll. Of special interest is the clean wobbler. At right is a sand-cast iron-base grain roll. Magnesite was used as an undercoat to the charcoal blacking applied to the mold before pouring.

magnesite flour is used to reduce the permeability of the facing sand. A typical facing mixture would consist of 20 lb magnesite flour and 200 lb silica rock. Silica rock is a friable sandstone which is quarried from the top portion of the Australian coastal sandstone deposits.

Crushing step

Crushing is done in a Chilean mill to provide a natural bonded facing sand. For steel, steel-base alloy roll wobbler cores, and deep-seated cores in heavy metal section castings, a mixture of 200 lb silica rock, 56 lb magnesite flour, 5 lb ball clay, and 3 pints of core oil is suggested.

To insure best results:

(1) The magnesite must be iron-free, dead-burned clinker. It must be ground to the required fineness.

(2) Wash ingredients must be measured correctly.

(3) The completed mold must be thoroughly dry before casting.

(4) Strict temperature control must be exercised over the metal during the process.

▶ *Foundry Sand Handbook ready*

■ Completely rewritten by prominent foundry sand specialists, the long-awaited revision of the Foundry Sand Handbook is now available. This new volume contains more than twice as much information as its predecessor, including both a glossary and a bibliography in its 259 pages.

Individual sections deal with mode of occurrence of sands and clays, methods for sampling sands and clays, preparing sand mixtures for testing, methods of testing molding sands, chemical analysis of sand, testing cores and binders, control methods for cores, testing core pastes, interpretation of room temperature sand tests, testing equipment, and molding sand mixtures.

Personnel serving on the sixth edition revision committee consisted of P. E. Kyle, Chairman, Cornell University, Ithaca, N. Y.; J. E. Foster, Secretary, A.F.S., Chicago; B. H. Booth, Carpenter Bros., Inc., Milwaukee; A. E. DeClercq, Lauhoff Grain Co., Detroit; H. W. Dietert, Harry W. Dietert Co., Detroit; N. J. Dunbeck, Eastern Clay Products, Inc., Jackson, Ohio; A. I. Krynitsky, N.B.S., Washington, D. C.; O J. Myers, Archer-Daniels-Midland Co., Minneapolis; L. B. Osborn, Tri-State Sand Co., Corinth, Miss.; J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind.; C. A. Sanders, American Colloid Co., Chicago; S. A. Wick, New Jersey Silica Sand Co., Millville, N. J.; E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit; and E. C. Zirzow, Werner G. Smith Co., Cleveland.

Special credit is due to B. H. Booth, J. E. Foster, J. H. Lowe, J. A. Rassenfoss, C. A. Sanders, and R. G. Thorpe for serving as an editorial committee in preparing this revision.

▶ *Cites A.F.S. for technical aid*

THE ECONOMIC COOPERATION ADMINISTRATION

CERTIFICATE OF COOPERATION

awarded to

American Foundrymen's Society

for furnishing technical assistance to the Peoples of the Marshall Plan Countries to aid them in maintaining individual liberty, free institutions and peace.

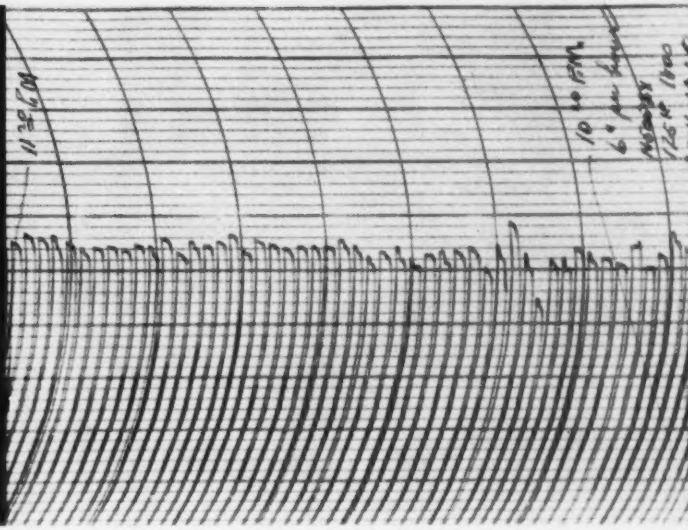
December 29, 1951

ACTING ADMINISTRATOR

Role of the American Foundrymen's Society in aiding European industrial productivity by furnishing technical assistance was recently cited in the above Certificate of Cooperation presented to the Society by the Economic Cooperation Administration. A.F.S. is continuing its program of technical assistance to international foundrymen by sponsoring two extensive tours of United States foundries in cooperation with the Mutual Security Agency, successor to ECA. The tours are scheduled to include the week-long A.F.S. International Foundry Congress & Show to be held in Atlantic City, May 1 through 7. As scheduled, Study tour "Red" will begin April 18 and include visits to foundries in the New York, Cleveland, Chicago and Cincinnati areas. Study Tour "Blue" will also start April 18 and include New York, Buffalo, Detroit, Chicago, and Pittsburgh foundries.

An actual record of one hour's operation of a typical manually controlled Model "80" Speedmullor. Fifty 1-ton batches of synthetic molding sand were loaded, mulled to maximum physical properties, and discharged in this period.

Batch after Batch...



... A CONTINUOUS SUPPLY OF COMPLETELY MULLED SAND ...

WITH A SPEEDMULLOR

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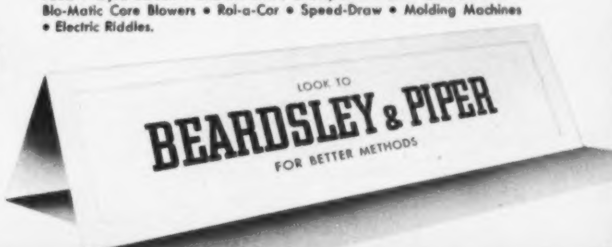

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Wisconsin and Southeastern founders meet at *Regional Foundry Conferences*

Reporters for the Wisconsin Regional Foundry Conference were: Donald M. Gerlinger, Walter Gerlinger, Inc., Milwaukee; Erwin G. Tetzlaff, Pelton Steel Casting Co., Milwaukee; and the chairmen and co-chairmen of the various sessions. Photographer was Walter V. Napp, Delta Oil Products Co., Milwaukee. For the Southeastern Regional Foundry Conference, J. P. McClendon, Stockham Valves & Fittings, Birmingham, was reporter and photographer again this year.

Banquet table neighbors during the Wisconsin Regional Foundry Conference were (left to right) William J. Grede, Grede Foundries, Inc., Milwaukee, president, National Association of Manufacturers; A.F.S. National President Walter L. Seelbach, Superior Foundry, Inc., Cleveland; and Wisconsin Chapter President George E. Tisdale, Zenith Foundry Co., Milwaukee.

■ Some 1000 foundrymen attended the two oldest annual regional conferences during February—the Wisconsin Regional held at the Hotel Schroeder, Milwaukee, February 8 and 9, and the Southeastern Regional, Tutwiler Hotel, Birmingham, Ala., February 21 and 22. Known for 19 years as the Birmingham Regional, the Southeastern got its name when this year the Tennessee Chapter joined the Birmingham District and the University of Alabama Chapters as a sponsor. Sponsors of the 15th Annual Wisconsin Regional were the Wisconsin Chapter and the University of Wisconsin.

Chairman of the Wisconsin Regional was J. G. Risney, Risney Foundry Equipment Co., Milwaukee. Robert V. Osborne, Lakeside Malleable Castings Co., Racine, Wis., headed the Program Committee. C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., was chairman of the Southeastern Regional, with Fred K. Brown, Adams, Rowe, Norman, Inc., Birmingham, in charge of the conference program.

Wisconsin regional

The Wisconsin Regional opened under the chairmanship of George E. Tisdale, Zenith Foundry Co., with a welcome from Dean M. O. Withey, College of Engineering, University of Wisconsin. Dean Withey urged foundrymen to carry on educational guidance programs to encourage qualified students to embark on an engineering career to help meet present and future high demands for engineers.

First technical session consisted of a comprehensive review of foundry health and safety problems by Kenneth M. Morse, A.F.S. National Office. A good safety, hygiene, and air pollution program provides preventive maintenance for manpower, he declared. He outlined the problems, told why they should be solved and said that the best solutions come from the foundry industry which has the most experience with its own problems.

At the luncheon, A.F.S. Secretary-Treasurer Wm. W. Maloney announced that exhibit space at the 1952 International Foundry Congress had been sold completely by February 6. He cited the value of the interchange of technical information which occurs at an International.

Second luncheon speaker, Frank G. Steinebach, Penton Publishing Co., Cleveland, compared today's foundry industry with the industry on the eve of the United States' entry into World War II and estimated that its capacity was about twice what it was in 1940. He predicted an upward trend in castings production.

J. G. Risney, Risney Foundry Equipment Co., presided at the luncheon meeting.

In the first series of group meetings, Charles W. Briggs, Steel Founders' Society, Cleveland, spoke on *"Steel Foundry Cleaning Room Practices;"* John P. Holt, Basic Refractories, Inc., Cleveland, described *"Basic Cupola Operation;"* George Verbeke, John Deere Malleable Works, East Moline, Ill., presented *"Quality Control in the Malleable Foundry;"* Martin G. Dietl, Schaible Co., Cincinnati, discussed non-ferrous cleaning room practices; and George K. Dreher, Foundry Educational Foundation, Cleveland, reviewed pattern engineering and the FEF program.

Mr. Briggs described techniques for chipping, flame washing, powder washing, and arc methods of cleaning. He recommended use of oil on fins and base of fins to speed metal removal by chipping. V. E. Ziemer, Maynard Electric Steel Castings Co., Milwaukee, was chairman.

Describing methods of lining and operating a basic cupola, Mr. Holt said the basic cupola gives lower sulphur, permits use of an all steel charge, makes carbon as high as four per cent possible, and gives a cleaner drop. Harold Schwengel, Modern Equipment Co., Port Washington, Wis., presided; Harold Zuehlke, Allis-Chalmers Mfg. Co., was co-chairman.

Quality control presents a correct, unbiased picture of process quality, declared Mr. Verbeke in describing its application in his plant. Scrap and salvage costs were reduced he said. N. Amrhein, Federal Malleable Co., West Allis, Wis., and John Goodwin, Malleable Iron Range Co., Beaver Dam, Wis., were co-chairman.

Mr. Dietl outlined the relationships between minimum casting cleaning costs and the various foundry departments. It is cheaper to mechanize in the long run, he stated, wherever it is possible to improve flow of material. Chairman of the meeting was John L. Kammermeyer, Federated Metals Div., American Smelting & Refining Co., Milwaukee; co-chairman was John Bradisse, Waukesha Foundry Co., Waukesha, Wis.

Walter Kollmorgen, Kollmorgen Pattern Works, and A. F. Pfeiffer, Allis-Chalmers Mfg. Co., presided at Mr. Dreher's session in which he described FEF activities in the field of pattern engineering.

A second round of group meetings concluded the first day's technical meetings. A. S. Grot, Edward Valves Inc., East Chicago, Ind., described his firm's program for redesign and standardization of valve bodies to improve yield and reduce cleaning costs. E. J. Schneider, Grede Foundries, Inc., and J. R. Bach, Falk Corp., Milwaukee, were co-chairmen.

At the gray iron session, J. Allen Wickett, Monsanto Chemicals Co., Springfield, Mass., pointed out that while synthetic resin core binders are not a cure-all, they cut baking time in half and give off less gas. C. W. Schwenn, Brillion Iron Works, Brillion, Wis., and E. Gruetzmacher, Universal Foundry Co., Oshkosh, Wis., conducted the session.

Experiments with oxygen in air furnace melting at Badger Malleable & Mfg. Co., were described by J. B. LaPota, National Cylinder Gas Co., Chicago, at the second malleable meeting. Use of oxygen with a cold metal charge, for surface oxidation of residual elements, and coal fired annealing furnaces were described. H. C. Stone, Belle City Malleable Iron Co., Racine, presided. Co-chairman was Carl Grobschmidt, Badger Malleable & Mfg. Co.

University of Alabama students Sinclair Lathem (left) and Charles Pandelis mold under watchful eyes of (left to right in background) A.F.S. Vice-President I. R. Wagner, Electric Steel Castings Co., Indianapolis; Past President L. N. Shannon, Stockham Valves & Fittings, Birmingham; and T. H. Benners, Jr., T. H. Benners & Co., Birmingham, Ala., past national director, prior to Southeastern Regional Foundry Conference.

Teamwork solves problems

John W. Bolton, Lunkenheimer Co., Cincinnati, spoke on *"Problems in a Non-Ferrous Pressure Casting Foundry."* He stressed importance of teamwork between engineering and foundry departments and the significance of records in obtaining standardization of operations. C. Kotowicz, Ampco Metal Inc., Milwaukee, presided, with D. Bosma, Bucyrus-Erie Co., South Milwaukee, co-chairman.

"Modern Pattern Shop Equipment" was the subject of I. Meyers, Delta Manufacturing Co., Milwaukee, at the pattern session ending the first day of technical meetings. Co-chairmen were A. Fischer, Chas. Jurack Co., Milwaukee, Wis., and Walter Kollmorgen.

G. E. Tisdale, presided at the banquet concluding the first day's activities. Frank Kirkpatrick, news commentator, was principal speaker.

Group meetings continued during the morning and afternoon of the second day of the Wisconsin Regional. M. E. Annich, American Brake Shoe Co., Mahwah, N. J., described a program for training foremen in work simplification. Work simplification can be practiced by anyone, he said. E. G. Tetzlaff, Pelton Steel Casting Co., presided. Co-chairman was C. J. Zilch, Bucyrus-Erie Co.

Bradley H. Booth, Carpenter Brothers Inc., Milwaukee, gave locations of principal foundry sand deposits and methods of sand production and testing in his talk. T. H. Tanner, Zenith Foundry Co., presided.

Speaking on *"Mechanics of Foundry Mechanization,"* R. J. Anderson, Belle City Malleable Iron Co., gave principles of mechanization and showed how they were applied in his plant, Jos. Kropka, Chain Belt. Co., Milwaukee, and Paul Anderson, International Harvester Co., Milwaukee, were co-chairmen.

Speakers at the morning non-ferrous session were T. Kramer, Wm. F. Jobbins, Inc., Aurora, Ill., and D. LaVelle, Federated Metals Div., American Smelting & Refining Co., Barber, N. J. M. E. Nevins, Wisconsin Centrifugal Foundry, Inc., Waukesha, Wis., and K. Jacobs, Standard Brass Works, Milwaukee, were co-chairmen.

Mr. LaVelle spoke on problems of metallurgical control and listed important causes of defects in aluminum castings as pouring practice causing dross and air bubbles, inadequate gating, hydrogen pickup, and clay balls. Mr. Kramer discussed gating principles and applications, and test bars.

Carl Haertel, Falk Corp., spoke on *"Steel Casting Problems and How They Affect Production"* at the pattern session. A. Fischer, Chas. Jurack Co., presided, with H. Arneson, Spring City Pattern Works, Waukesha, Wis., as co-chairman.

Luncheon speaker the second day was A.F.S. President Walter L. Seelbach, Superior Foundry, Inc., Cleveland, A. F. Pfeiffer, Allis-Chalmers Mfg. Co., presided.

Mr. Seelbach stated that A.F.S. records and publishes foundry accomplishments and points the way to progress through research carried on at research institutions and schools in the United States and Canada. He called on all foundries to participate in the 10-year Safety & Hygiene & Air Pollution Program recently inaugurated on behalf of the industry by the Society.

The Wisconsin Regional concluded with a fourth round of group meetings. At the steel session, William S. Pellini, Naval Research Laboratory, Washington, D. C., discussed performance of castings under severe service conditions. There is no real difference in notch toughness between rolled steel, cast steel, and forged steel, he declared.

Chairman of the meeting was George J. Barker, University of Wisconsin; co-chairman was D. C. Zuege, Sivyer Steel Casting Co., Milwaukee.

Harry Gravlin, Ford Motor Co., Dearborn, Mich., conducted a casting clinic, using defective castings brought by members of the audience. L. J. Woehlke, Grede Foundries, Inc., was session chairman.

In the malleable session, Thomas F. Butler, Ford Motor Co., reminded his listeners that mechanization means maintenance and urged them to practice preventive rather than remedial maintenance. Co-chairmen were Ralph N. Schaper, Wisconsin Appleton Co., South Milwaukee, and Martin A. Harder, Lakeside Malleable Castings Co.

John W. Bolton, Lunkenheimer Co., Walter W. Edens, Alloy Engineering & Casting Co., Champaign, Ill., and T. Kramer, Wm. F. Jobbins, Inc., provided answers to questions posed by non-ferrous foundrymen at an Information Forum. John Bradisse, Waukesha Foundry Co., was moderator.

Pressure casting of matchplates and plaster casting of core boxes were described and illustrated by Steve Denkinger, Atlas Plastic & Aluminum Plate Co., Milwaukee at a pattern session. Walter Kollmorgen and M. Frankard, Delta Mfg. Co., were co-chairmen.

Southeastern regional

Eight technical sessions, a luncheon, a banquet, visits to Birmingham area plants, and an evening of entertainment

made up the program of this year's Southeastern Regional. Paul H. Stuff, Ross Meehan Foundries, Inc., Chattanooga, Tenn., led off with a discussion of "*Castings vs. Weldments.*" Castings are as weldable as comparable compositions in wrought steel, he said. Charles B. Saunders, Tennessee Products & Chemical Corp., Nashville, presided.

F. G. Sefing, International Nickel Co., New York, said in the next technical talk that to make wholly sound castings metal should progressively solidify from the thinnest sections and coldest metal to the heaviest section and the hottest metal. E. A. Thomas, Thomas Foundries, Inc., Birmingham, was session chairman.

Speaking at the luncheon meeting, A.F.S. Vice-President I. R. Wagner, Electric Steel Castings Co., Indianapolis, Ind., traced the growth of A.F.S. to its present size and international prestige. The huge size—some 10,000 members in 33 countries with 95 per cent of the membership in the chapters—he said, requires local management and development, hence the importance of active chapters. Fred K. Brown, Adams, Rowe & Norman, Birmingham, presided.

Following lunch, Warren C. Jeffery, University of Alabama, described properties of cores bonded with various proprietary binders and with tall oil glycerine esters, a paper pulp by-product. M. L. Carl, Sloss-Sheffield Steel & Iron Co., Birmingham, was session chairman.

Elliot M. Cranford and James G. Lovell, Stockham Valves & Fittings, Birmingham, described Stockham core practices and showed motion pictures of production methods. The core room makes cores for three foundries (gray iron, malleable, and bronze) which use baked cores, green sand cores, and green-topped cores. Chairman of the session was Morris L. Hawkins, Stockham Valves & Fittings.

Ray H. Moore, Claude B. Schneible Co., Detroit, concluded the first day's technical meetings with a discussion of foundry mechanization. He recommended avoiding clam-shell handling of coke if possible, water disposal of slag, and interlocked sheet piling for material storage bins. W. E. Jones, Stockham Valves & Fittings, presided.

Plant visitations were held the morning of the second day with technical meetings being resumed in the afternoon. Walter R. Jaeschke, Whiting Corp., Harvey, Ill., spoke on "*Sources of Trouble in Cupola Operation.*" Use of a double row of tuyeres has increased since 1947, he said, because they promote better combustion with lower quality coke.

Automatic air weight control is one of the cheapest good control items, declared Mr. Jaeschke. Harry G. Mouat, Harry G. Mouat Co., Birmingham, presided at the meeting.

Machinability improvements in gray iron through silicon carbide additions in the cupola were described by Frank S. Kleeman, consultant, Pittsburgh. Fred C. Barbour, McWane Cast Iron Pipe Co., Birmingham, was chairman.

Final technical session featured Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., speaking on "*Quality Control.*" Meeting chairman was Frank H. Coupland, Jr., American Cast Iron Pipe Co.

Quality control is a philosophy of management according to Mr. Kuniansky. It is a management responsibility which cannot be delegated, he declared.

The Southeastern Regional concluded with the annual banquet. Principal speaker was Warren Whitney, James B. Clow & Sons, Tarrant, Ala.; his subject, "*Shall We Scrap It?*" T. H. Benners, Jr., T. H. Benners Co., Birmingham, was toastmaster and Charles K. Donoho, American Cast Iron Pipe Co., Birmingham, presided.

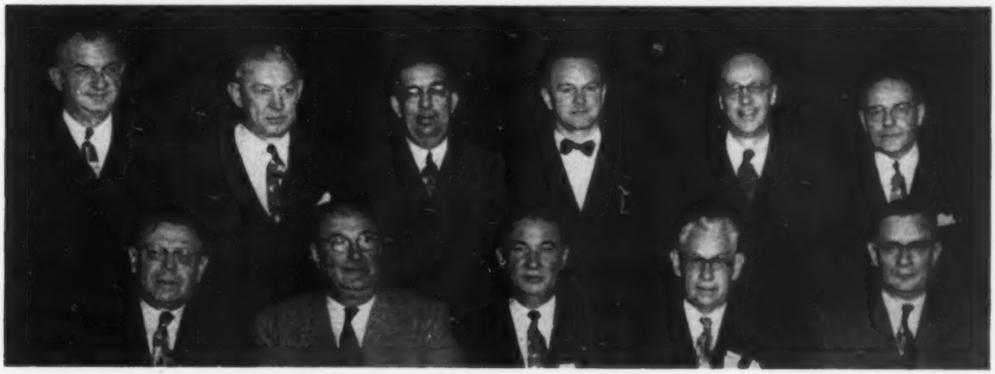
▶ *Guido Vanzetti dies*

■ Guido Vanzetti of Italy, president of the International Committee of Foundry Technical Associations, died Wednesday, March 5, in Milan, according to cables received from the Italian Foundrymen's Association and from Mario Olivo of Milan, past Association president.

Mr. Vanzetti was to have led a delegation of Italian foundrymen to the 1952 International Foundry Congress and as head of the International Committee was to have presided at its meetings during the Congress and to have participated in the International Reception.

▶ *Publish 1951 Index*

■ The 1951 Index to AMERICAN FOUNDRYMAN, Vol. 19 and 20, is available gratis on request. Previously issued each year as a second section of the December issue, the Index is now published separately and sent only when requested. Order your free copy of the 1951 Index from AMERICAN FOUNDRYMAN, 616 S. Michigan Ave., Chicago.



Eleven past presidents of the Wisconsin Chapter attended the Wisconsin Regional in Milwaukee. Seated left to right are: W. J. McNeill, Badger Malleable & Mfg. Co., S. Milwaukee; Roy M. Jacobs, Standard Brass Works; George E. Tisdale, Zenith Foundry Co.; R. C. Woodward, Bucyrus-Erie Co., S. Milwaukee; and Walter Gerlinger, Walter Gerlinger, Inc. Standing left to right are: H. E. Ladwig, Allis-Chalmers Mfg. Co.; B. D. Claffey, Acme Aluminum Alloys Inc., Dayton, Ohio; D. C. Zuege, Sivyer Steel Casting Co.; George K. Dreher, Foundry Educational Foundation, Cleveland; W. W. Edens, Alloy Engineering & Casting Co., Champaign, Ill.; and R. J. Anderson, Belle City Malleable Iron Co. McNeill, Jacobs, Claffey, and Dreher are past national directors.

Some aspects of the charpy test applied to steel castings

Serviceable steel castings may be rejected on the basis of charpy impact tests if the specimens are cut from poorly designed test castings. Experiments described below show how ever-present micro-conditions can be minimized to make impact tests truly reflect hardenability response and inherent toughness of cast steel. The author's work illustrates how castings producers and Army Ordnance establishments cooperate in achieving maximum acceptance of useable castings.

J. E. BLACK / *Captain, Ordnance Corps, Detroit Arsenal, Center Line, Mich.*

■ The charpy impact test is a valuable tool in evaluating the tendency of cast steel to fracture in a brittle manner, and more generally its ability to perform satisfactorily under conditions of multi-axial stress pattern, low temperature, and high rate of loading. In this test a specimen of definite dimensions and notch is fractured. The energy expended in fracturing the piece at a given temperature is then determined.

As with other types of physical test specimens, there arises the problem of securing a test coupon which is truly representative of the characteristic to be evaluated. Within a single sound casting there will be various modes of solidification; the distribution of inclusions, micro po-

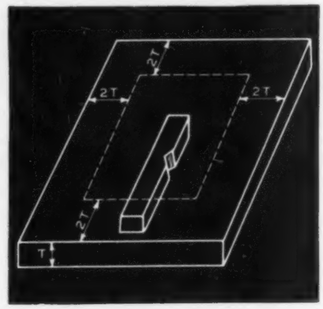
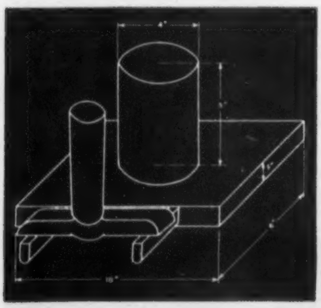
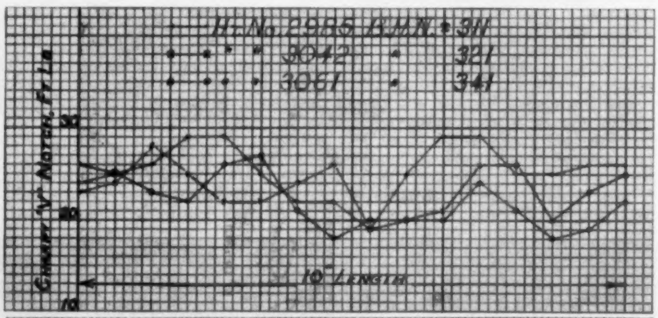


Fig. 1 . . . Test coupon. Letter "T" represents maximum casting thickness.





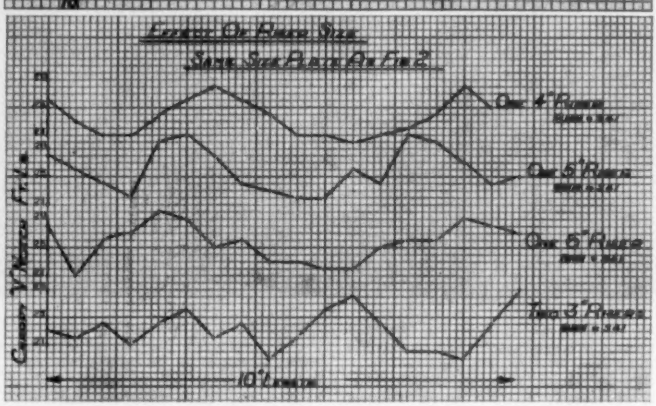


Fig. 2 (above) . . . Dimensioned sketch of casting set-up from which data for Fig. 2a and 2b were obtained.

Fig. 2a (above right) . . . Results for three plates. Variation is believed entirely due to respective modes of solidification. All graphs indicate considerably lower values under the riser with optimum conditions between riser edge and plate edge.

Fig. 3a (at right) . . . Illustrates effect of increasing riser size. As the diameter increases, the central depression is less pronounced and wider. In lowest graph the right hand depression is evident whereas effect on the left is comparatively obscure.

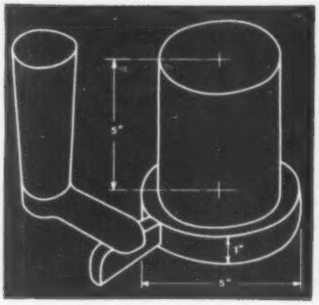


Fig. 3 . . . Set-up for graph at right.

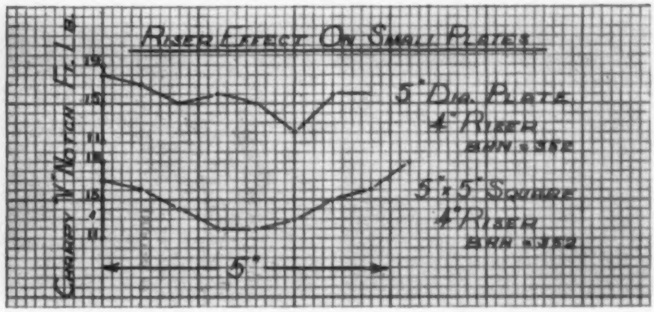


Fig. 3a . . . Effect of the riser on small plates of two different shapes.

rosity, micro shrinkage, etc., will vary. Energy determinations may vary significantly within a single usable casting.

Analysis of charpy data reveals that good shock properties are attained when (1) the steel matrix itself possesses the necessary toughness, (2) the inclusions are not in the form of thin envelopes surrounding the primary grains, and (3) the porosity, segregation, and/or shrink is essentially micro in character.

Steel Matrix: By this is meant the pseudo homogenous steel structure itself, devoid of inclusions, porosity, shrink, and macro segregation. Such a piece of cast steel is perhaps a theoretical curiosity. However, sufficient data are available which tend to indicate that the greatest energy absorption to fracture can be expected in fully hardened (99.9 per cent martensite) and tempered steel, free of temper embrittlement.

Inclusions: Some form of inclusion is always present, even under the best melting practices. However, harmful effect on impact properties is minimized where the inclusions are not in the form of stringers or envelopes around the primary grain boundaries. This harmful type can best be avoided by a low (less than about 0.025 per cent) sulphur content and proper deoxidation.

Micro Porosity, Segregation, and Shrink: These elements are in all probability responsible for erratic results on a single test coupon, and for the difficulty of correlating charpy test data with service experience. This stems from the effects of the solidification character upon these micro conditions. They vary

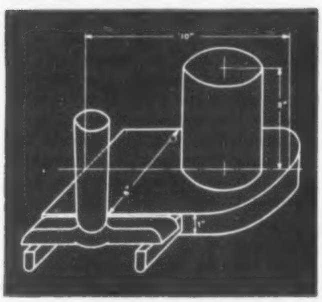


Fig. 4 . . . Set-up for graph at right.

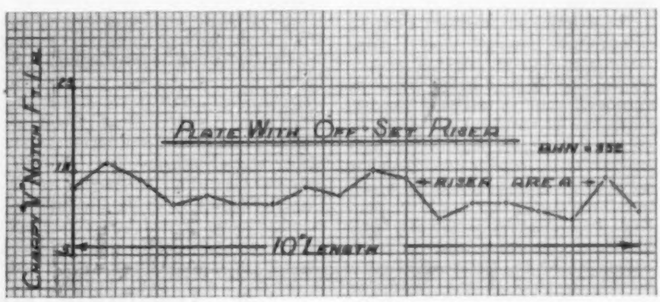


Fig. 4a . . . Note the depression that corresponds with the position of riser.

Fig. 5 . . . Set-up for graph at right.

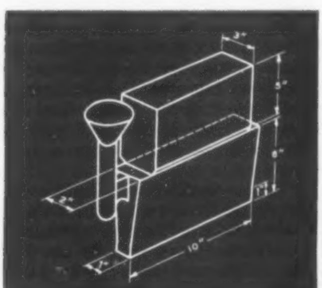
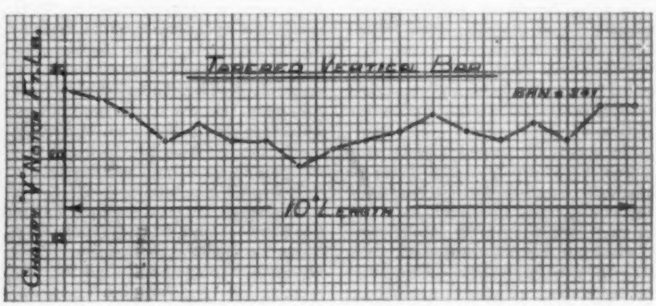


Fig. 5a . . . In general, vertical bars gave lower values than horizontal bars.



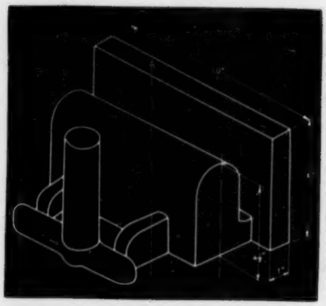


Fig. 6 . . . Set-up for graph at right.

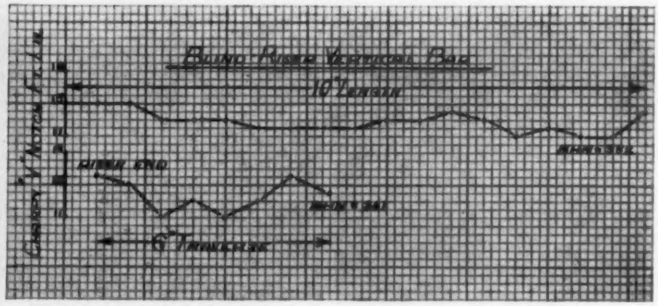


Fig. 6a . . . Six-inch traverse shows lower orders in center than ten-inch.

from thicker to thinner sections, horizontal to vertical planes, proximity to risers, etc. However, the normal amount of micro porosity, micro segregation, and micro shrink associated with good modern steelmaking practice, *while of little consequence in serviceability under impact loading,* is of great sensitivity in the charpy impact test.

Thus, whereas the castings may be completely acceptable in all the aspects of foundry practice, heat treatment, and serviceability, the producer may find it difficult to establish this fact through the charpy test.

The deleterious solidification conditions are generally found along the center line of sections, and in "hot spots." A good tough structure may well exist throughout the majority of the casting so that the referenced micro conditions have practically no significance in actual service. The problem, then, is to determine a test procedure and specimen which reflect essentially only the final structure and inclusion effect. However, the sensitivity of the charpy test to the referenced micro conditions is ever present, and at best their effects can only be minimized and made as uniform as possible throughout the test coupon.

Since impact properties are best in a fully hardened and tempered structure, the specimen must reflect this state throughout the entire section thickness. This attribute is predicated upon hardenability and the cooling rate at all points within the casting.

The most convenient type of test coupon is probably a flat plate of thickness equal to the thickest section of the casting. Studies have indicated that a charpy notch area taken from a mid-position which is at least two thicknesses away from any quenched edge will experience essentially the same cooling rate as the center of the thickest section of the casting. This corresponds to any position within the dashed area of Fig. 1. The notch should be perpendicular to the large face in order to more truly reflect conditions at the center.

If it were not for the complicating micro conditions, it would merely be necessary to select a plate large enough to accommodate the desired number of charpy samples. Unfortunately, this is not the case. Figures 2 to 6a illustrate the way in which charpy values vary across the test plate sections, as influenced by shape of plate and riser geometry. The hardenability (medium alloy, nickel-chromium-molybdenum) is ample to quench out a one-inch section in an agitated water quench. The impact values were taken at -40 F. In all cases the charpy specimens were machined out consecutively across the indicated dimensions. It is quite evident on examination of the graphs that where the charpy impact determinations are in the same order as the required minimum values, a single test plate may qualify or reject an entire heat, depending on where the specimens were taken. In addition, research studies such as transition curves may be seriously distorted where ostensibly uniform charpy specimens are cut from a casting.

It is thus desirable, at the onset of any study of charpy impact data in cast steel, to determine the type of test plate which will yield the highest and most uniform values for the particular foundry and heat treating practice. The fundamental purpose of the charpy test is to determine the hardenability response and ultimately the inherent toughness of the steel. It is by minimizing the test-sensitive but service-insensitive micro conditions that the more important full quenching and inclusion effects may be more accurately evaluated.

▶ *Available: steel casting film*

▪ Entitled *"Steel with a Thousand Qualities,"* 37-minute color motion picture film is devoted entirely to the manufacture of steel castings. It is sponsored by Lebanon Steel Foundry, Lebanon, Pa., where the film was shot. Lebanon employees made up most of the cast. Theme is a tour of the plant; shown is the production sequence for carbon steel and alloy steel castings, from blueprints to the completion of x-ray tests beneath a million-volt machine.

The viewer is brought close to the arc furnaces and the high-frequency induction melting furnaces to watch charging, tapping, and pouring. He sees pattern and molding functions, heading, gating, heat-treating, and all the other controlled steps needed in casting carbon, alloy, and stainless steel.

The movie has already been seen by more than 50,000 people since its release a few months ago. These include steel experts from Asia, Europe, and South America. Negotiations are now under way for the MSA to show the film to industrial groups in various foreign countries.

"Steel with a Thousand Qualities" is distributed by Lebanon and through Modern Talking Picture Service, Inc., New York. There are fifty-five 16-mm prints and one 35-mm print available for free showings.

Clay determination procedure improved

Testing sand with included combustibles

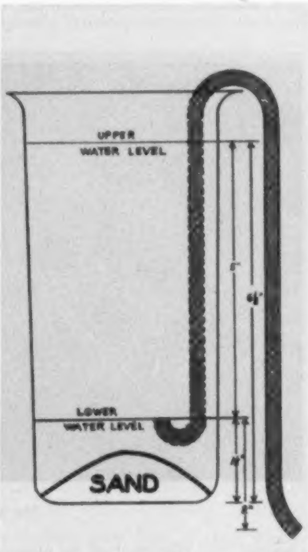
Procedure for determining clay in sand containing combustibles was submitted by O. J. Myers, Technical Director, Archer-Daniels-Midland Co., Minneapolis. It was developed in cooperation with the A.F.S. Twin City Chapter.

■ The standard siphoning procedure for determining A.F.S. clay does not distinguish between mineral and combustible matter such as wood flour, cereal, and sea coal. The test detailed here, however, determines clay in the presence of such organic material and is thus well suited for used molding sand. By washing out all the clay and part of the combustible, burning out the rest of the combustible, and then determining the total combustible by ignition from a fresh batch of the original sample, the clay value can be obtained by subtraction.

Equipment needed

Basic equipment consists of a beaker, a siphon, and an electric stirrer of the malted milk type. Baffles of some sort should be attached to the stirrer to eliminate any vortex that might prevent sand grains from being washed clean of clinging clay.

Before beginning the actual test, prepare a standard solution of sodium hydroxide by dissolving 30 gm of NaOH in 1,000 ml of distilled water. Do not store this solution more than two months; discard sooner if it flocculates. If the sand to be tested contains moisture, place about 100 gm of it in a drying oven for one hour at 225 to 250 F. After cooling, weigh 50.00 gm of the sand and carefully transfer it into a 1,000-ml tall-form beaker. Then fill a 500-ml graduated cylinder to the 475 ml mark with distilled water. Add 25 ml of the NaOH solution, carefully pour this 500 ml of new solution over the sand in the beaker, and place the electric stirrer in it (be sure stirrer



Analysis apparatus consists of 1,000-ml tall-form beaker and a siphon. Siphon should be made of 6-mm OD glass tubing, bent to approximate the shape shown.

has a grounded electrical connection before inserting).

(a) Stir for 5 minutes.

(b) Fill beaker to top mark with distilled water, bringing water level 6½ in. from the bottom.

(c) Allow the sand to settle for 10 minutes.

(d) Siphon off suspension so that 1½ in. of water remains in the base of the beaker.

(e) Refill beaker with pure distilled water to the top mark.

(f) Stir for one minute.

(g) Repeat steps *c*, *d*, *e*, and *f*.

(h) Allow sand to settle for 5 minutes.

(i) Repeat steps d and e.

(j) Repeat steps *f*, *h*, and *i* until suspension is clear enough to read newsprint through water in the beaker after the 5-minute settling period.

(k) Siphon off water as in step d.

(l) Decant water from the beaker, being careful not to disturb the washed sand.

(m) Place beaker containing wet sand in the drying oven at 225 to 250 F until all moisture has been driven off.

(n) Cool dried sand in a desiccator.

(o) Place dried sand in a 3-in. dry crucible and ignite in a muffle furnace at 1500 to 1800 F until it reaches constant weight. This should take at least one hour. Air must be available in the furnace to burn out all combustible matter.

(p) Cool sand in a desiccator.

(q) Weigh cooled, ignited, washed sample and subtract its weight from the original 50.00 gm. Doubling the difference expresses clay and combustibles in per cent.

(r) Now ignite a second 50-gm sample of the original dried molding sand, as in step *q*. Cool it.

(s) Weigh this cooled, ignited, unwashed sample and subtract its weight from 50.00 gm. Doubling the difference expresses combustibles alone in per cent.

(t) Subtracting the figure obtained in step *s* from the figure obtained in step *q* gives the per cent of A.F.S. clay.

No combustibles?

Steps *a* through *n* are typical of wash methods for clay determination. For testing sands containing no combustible matter, these basic steps need only be concluded by weighing the cool, dried sand, subtracting this weight from 50.00 gm, and doubling the difference to express per cent A.F.S. clay. The remaining steps (*p* through *t*) are obviously for the determination of combustible material, and therefore can be eliminated.

Process and product advantages of gray iron castings

Although some 12 million tons of gray iron castings are made each year to fulfill thousands of uses, their functional and economic advantages still are not understood by some designers and manufacturers and are only imperfectly recognized by others. In this article, condensed from the Gray Iron Founders' Society booklet, *"Advantages of the Gray Iron Casting Process and Products,"* the author describes the metal casting process on the basis of (1) improved operational or functional quality of product, and (2) economic advantages as a manufacturing method.

C. O. BURGESS / *Technical Director, Gray Iron Founders' Society, Cleveland*

The shortest distance between raw material . . .

■ Most direct and simplest production method available to industry is the metal casting process. Rapid translation of projected design into a finished product is achieved by pouring molten metal representing either exactly or within close tolerances the final dimensions of a desired product. Photographs on this page show the process and the product in the case of a moderately large gray iron casting. This basic advantage—simplicity of production—exists whether very small or very large castings are produced, without regard as to their complexity.

Second, the external shape and size of castings can be suited to the functions they are to perform. Sand castings weighing from a few ounces to hundreds of tons can readily be produced in almost any shape or complexity desired. Some designs can *only* be economically produced as castings.

For example, Fig. 2 illustrates one of a number of engine parts that would be difficult and prohibitively expensive to produce except as gray iron castings. The only real limitation on castings is ability to produce the desired shape in the wood, metal or plaster form used as a master pattern in molding. Actually, the flexibility of this molding process is so great it permits use of undercuts and curved, reflex contours not possible with other high production processes.

This design flexibility should not obscure the fact that it is always advisable for casting purchasers to consult with the foundryman during the design stage. Although foundrymen are accustomed to meeting exacting design specifications, there is no question but that optimum quality, prompt delivery and serviceability of the cast product, and more particularly, maximum economy to the purchaser, will result from a cooperative effort by the designer and casting producer.

A few general precautions in specifying castings are worthy of note—large, flat, thin sections (under 1/16-in. thick as-cast) although feasible from a molding standpoint, are normally avoided in a casting as they usually present problems in feeding. Except for such limited areas as cooling fins, etc., heavier wall sections should be specified.

Parts as small as shuttles have been successfully cast in gray iron in competition with forming methods, but obviously a minimum size exists below which production methods other than casting become competitive or desirable. Except in such special cases, the known economic advantages of castings must be carefully considered.

Permit maximum strength

Since casting design does not depend upon any subsequent forming process, the optimum amount of metal can from the outset be placed in the best position for maximum strength, wear resistance, etc., and omitted where it is not required. This design freedom, combined with ability to core out unstressed sections, often permits appreciable weight savings (See Table 1).

Maximum rigidity in the final section is primarily a matter of designing a section of the desired shape. This principle is shown in Fig. 1. If a load is applied to both casting and

plate, the casting, although equal in weight, will deflect approximately only one-fifth as much as the plate.

Even if the softest iron, with approximately half the modulus of elasticity of steel, were selected to meet maximum machinability, thermal shock resistance or castability requirements, the gray iron casting illustrated would still be 2½ times as rigid as the steel plate section.

Section contours needed to develop a given rigidity can be produced at will in the casting process, but would be difficult and comparatively expensive to produce by other methods.

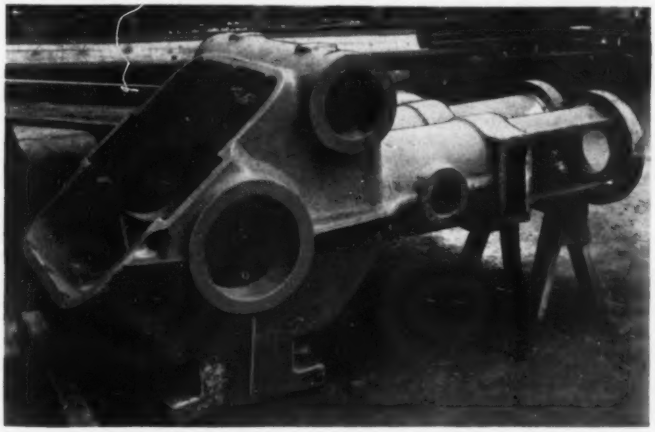
Other fabricating processes are limited in that producers must take into consideration such factors as feasibility and cost of welding reinforcing bars, use of a design simple enough to permit forging, or use of sections thin enough to permit stamping. On the other hand, Fig. 3 shows how reinforcing members can readily be included as an integral part of a casting.

Attractive product appearance for maximum sales appeal is readily achieved with castings because shape is not restricted to the assembly of preformed pieces as in welding processes, or governed by the limitations of forging or stamping.

It is fortunate that the smooth graduated contours and streamlining essential to sales appeal usually coincide with conditions for easiest molten metal flow in a casting, prevention of stress concentration on solidification, and minimum residual stress in the final casting. Commercial utilization of this design freedom is illustrated in Fig. 4.

Production of a complex part as a single unit is possible in the casting process because of great design freedom. This is of particular significance when exact alignment must be held, as in high-speed machinery, machine tool parts, or engine and plates and housings that carry shafts.

One-piece construction also eliminates joints and the resultant possibility of oil leakage, water leakage or corrosion at the joints. An engine block exhibiting an involved outer shape and a number of internal passages is one of the most obvious examples of combining a group of normally independent elements into a single integral casting. All attempts to replace gray iron in such a use by other methods of fabrication or other materials have always resulted in a sacrifice in functional efficiency and economy.



... and finished product is a casting.

The diesel engine base shown in Fig. 5 is another typical example wherein the rigidity and vibration absorption of a single integral gray iron casting have been utilized. If a part requires a specially designed or irregular surface for maximum operating efficiency or possesses interior passages or pockets, the possibility of casting the part as an integral unit should receive consideration over other methods of construction.

From a quality viewpoint, a single integral casting is a safeguard against the possibility of costly assembly errors or mismating of parts. The latter is often cumulative when a number of pieces dovetail together and is an everpresent possibility in any complex cutting, forming or fitting operation. On the other hand, once dimensions for a one-piece casting are established as correct, exact duplication is automatic.

Use of the known principles of casting design, combined with periodic determination of physical properties of test bars cast from molten metal, assures a high degree of reproductibility and dependability in casting.

This same sort of dependability is not as practical in such production methods as welding, which involves a large amount of skilled hand labor, and may result in hidden defects such as cracks, lack of fusion, etc.

When defects occur in castings (at least insofar as gray iron castings are concerned), they are normally in the form of roughly spherical shrinkage areas or gas holes, rather than cracks or seams. Such defects do not raise stresses to the same degree as cracks and are normally recognizable on surface examination or preliminary machining. The defective casting can generally be detected and scrapped before being incorporated in a finished unit.

Stress freedom, simplicity

In summarizing the functional advantages of castings, it is clear that two characteristics are of direct interest to the design engineer or manufacturer.

The first of these is the unusual design freedom obtainable only in castings. Given this freedom, it is possible (a) to suit external contours to almost any requirement, (b) to place metal at exact locations where it is needed for rigidity, wear and corrosion resistance, or maximum endurance under dynamic stress, (c) to produce a complex part as a single, dependable unit, and (d) to confer an attractive, streamlined appearance, important in sales appeal.

Second advantageous characteristic is that a casting is the shortest path between a projected design and the finished product. This simplifies development problems and permits production to expand rapidly from a few units to thousands of units with a minimum of time and special equipment.

Economies of the casting process can be divided roughly into those associated with casting as a production method, and those resulting from favorable characteristics of the particular metal used in casting.

Because the casting process permits manufacture of a product as an integral unit, substantial econo-

mies in production are possible. Production of a single casting eliminates costs of stocking, handling, cutting and machining several components. Necessity for scheduling or routing parts so that they will be simultaneously available at a location for assembly is also eliminated.

Existence of the inevitable extra labor and supervisory costs when castings are not used has been recognized by some designers but is not always anticipated by manufacturers.

The latter can be misled in their choice of production methods by advertisements that compare only the price of rolled metal before assembly into the finished product with the cost of cast metal already incorporated in the finished product.

Preparation, welding and forming charges connected with the use of a number of rolled steel elements, however, greatly exceed the base metal cost and are determining factors in any cost comparison.

Figs. 6, 7a and 7b indicate the simplification possible in replacing a fabrication with a casting. In the chain drive housing in Fig. 6, use of the casting on the right eliminated assembly of a series of individual parts with savings in torch cutting, machining, forming and welding operations, resulting in a casting cost only one-third that of the weldment.

Comparison of the weldment (Fig. 7a) and casting (7b) is still more significant since the spidery character of this blower housing originally indicated a probable superiority for welding, in the manufacturer's opinion. In a production test, however, use of a casting for this part eliminated assembling and handling 124 separate pieces. Machining cost of the welded assembly was 77 per cent higher than that of the casting, resulting in a $222 balance in favor of its production as a casting.

Undue emphasis may be given to possible savings in metal weight using a given production method as opposed to casting. Certainly such weight advantages do exist, sometimes in favor of castings and sometimes in favor of other methods. More often, weight savings depend more on use of the proper casting, welding or forging design than on altering the production method or base metal.

Individual circumstances known only to the producer finally control the choice of manufacturing method. While the outlined economy of producing a part as an integral unit casting may be the deciding factor in a majority of cases, each case must be considered separately before assuming that any one process will yield the maximum combination of efficiency and economy.

Decrease machining costs

Probably the most evident saving associated with casting is the ability to decrease machining cost. Machine shop operations are a vital part of industry, but machine shop chips are the most costly and useless things that can be produced.

One designer has estimated that in a well-mechanized shop every pound of material removed by rough machining costs at least 50 cents. If new or special tooling is necessary, as is frequently the case in products where casting design freedom has not been employed, machining cost will increase correspondingly above this estimate.

Reason for reduction of machining expense in a casting is simple—holes, interior passages and pockets required by the design, instead of being laboriously machined, are reproduced in the casting by placing sand cores of the correct dimensions in the original mold. Special surface contours are also incorporated in and made a part of the original pattern design.

Obviously, savings vary with the complexity of the casting and the amount of machining that would otherwise be required. One division of General Motors has estimated an overall saving in machining cost of 50 per cent by using castings.

Table 1 includes typical savings in machining cost reported by other sources. Selecting an example at random, one large engine builder has estimated that attempting to machine the special port contours required in his diesel engine as opposed to casting them in the desired shape would increase the cost of this one engine component by several hundred dollars.

Metal savings resulting from the ability of the casting process to place metal only where needed, and to omit it by coring out where not needed, are obvious. It is not always recognized that this characteristic often permits a definite saving in

Fig. 1 . . . Casting design freedom permits maximum rigidity. If load is applied to plate A (left) and casting B (right), casting although equal in weight will deflect only about one-fifth as much as the plate.

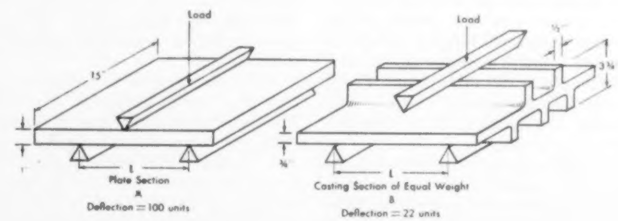
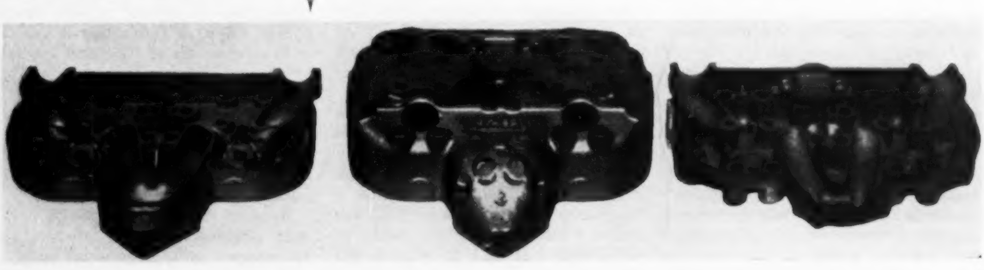


Fig. 2 . . . Diesel cylinder head sectioned to illustrate permissible complexity in a single integral casting.



the final as well as the rough weight of a component.

For example, in diesel engine parts careful comparison showed that use of gray iron castings rather than weldments resulted in a saving of 14 per cent in total weight, as well as a 53 per cent reduction in overall costs. Another producer reports drastic weight savings (approximately 50 per cent) using cast instead of forged crankshafts in the 500 to 5000 lb weight range, because of ability to core out shafts and use hollow journals, thus avoiding superfluous weight.

Confirmation from another source is furnished by comparison of rough weights of forgings and castings in Table 1. It is beginning to be recognized that wider application of known stress analysis principles, coupled with the design freedom inherent in casting, will result in further substantial savings in gray iron components.

From the viewpoint of economics, it is of interest that when metal wastage does occur from manufacturing, machining or processing it is normally less vital in a casting, particularly a gray iron casting. High efficiency of the cupola as a melting unit and general simplicity of the casting process permit gray iron scrap to be directly remelted and recast into the desired shape with a minimum material and money.

Since a casting usually provides the shortest route from raw material to finished product, reducing the development cost of the product, this may be a deciding factor in the selection of the casting process. This and later savings are effected because preparation of the master pattern is the only primary requirement and the major primary cost. This cost is less than that generally involved in preparation of dies or setting up and operating special tooling or welding arrangements.

Table 1 -- Comparison of Material Loss and Machining Time of Forged Steel and Gray Iron Crankshafts

	Steel Forgings			Gray Iron Castings			Savings	
Type of Engine Diesel	Lb. Rough Weight	Lb. Finish Weight	Hours Machine Time	Lb. Rough Weight	Lb. Finish Weight	Hours Machine Time	Lb. Material	Hours Machining
6 cyl	2520	657	160	700	637	80	1800	80
6 cyl	1344	287	100	256	216	30	1017	70
4 cyl	672	140	60	177	141	34	496	26
4 cyl	924	279	73	300	278	55	623	18
6 cyl	1316	330	75	364	354	34	976	41
3 cyl	469	133	73	120	96	24	312	49
4 cyl	630	168	84	159	126	51	439	33

Table 1 . . . Typical savings in material and machining costs reported by several automotive manufacturers using castings instead of forgings.

Pattern cost, in common with other capital charges, must be absorbed by the product. Thus the greater the number of molds produced from a given pattern, the lower the cost chargeable to each casting.

Economic superiority of casting over individual welding of parts is demonstrated when a minimum of three to ten castings are made from a pattern. The breakeven point varies with size and complexity.

It is always possible with sand molding to hold pattern cost to a minimum by selecting a pattern material of maximum machinability or formability, and of minimum cost for the number of parts to be cast from it. No such leeway is normally possible in constructing dies or jigs.

For example, if only one or two experimental castings are needed, the pattern can be made from modeling clay, wax or plaster. In emergencies, a simple mold cavity may even be formed without a pattern on the foundry floor. As the number of castings increases, more durable pattern materials are needed.

These in order of increasing durability are pine, hardwood (usually mahogany), aluminum, steel and gray iron. Where a favorable combination of suitable casting shape and high production rate exists, patterns have been eliminated in special cases and the desired casting cavity cut directly into a permanent metal mold that can be re-used to produce thousands of castings.

Patterns and cores for a casting can be made to embody a final contour exactly, reducing machining and handling to a minimum. Since the pattern is deliberately made in

Fig. 3 . . . Reinforced cast sectional base of drilling machine illustrates how reinforcing members can readily be included as part of a casting.

Fig. 4 . . . Casting design freedom permits product streamlining and attractive designs as illustrated by this contoured machine tool assembly.

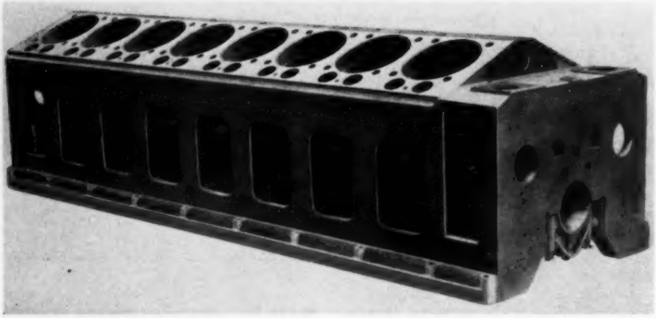


Fig. 5 . . . This cast diesel engine base exemplifies how a single integral casting permits maximum rigidity and absorption of vibration.

readily workable material, it can often be directly and quite simply altered to meet last minute or developing changes in casting dimensions or product design. There is no necessity to scrap or redevelop jigs, dies or tooling setups.

The simple existence of a pattern on a storage rack assures the manufacturer of a permanent and regular supply of identical cast parts meeting his specifications. For example, if a casting is spoiled in the final machining operation, or an additional casting is needed at a later date, it can normally be replaced more quickly and at a lower cost than a forging or fabrication.

From a cost standpoint one of the most important features of castings, particularly gray iron castings, is that they are normally available from a local source, minimizing delays in shipment and freight charges and, more important, facilitating full understanding of customer requirements. These economic advantages are obviously at a maximum when a close working relationship is maintained between the customer's designers or engineers and the foundry.

The casting process is immediately responsive to variations in product demand. Emergencies or varying market conditions involving increased or decreased production can be immediately met at minimum cost since a pattern corresponding to the product is stored by the foundry or manufacturer.

All other facilities, such as mold flasks and molding machines, are part of standard foundry operating equipment and are used with a large number of different patterns. The required number of sand molds to meet a given demand are simply rammed up from individual patterns, using standard molding equipment, and the castings are poured. Castings varying from a few ounces to thousands of pounds are available when the customer needs them.

Simplicity of the casting process results in an economy generally unobtainable with other methods of construction. Savings stem from four unique advantages: (1) ability to combine a number of individual parts into a single casting, (2) casting design freedom that reduces machining and metal wastage to a minimum, (3) low cost of patterns compared with equipment required by other production methods, and (4) production flexibility at low cost.

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Fig. 6 . . . Welded chain drive housing (left) cost three times as much as cast housing shown at right.

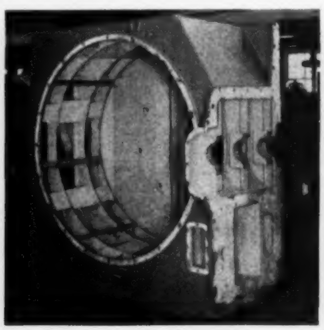

Fig. 7a . . . Welded blower housing required assembling and handling of 124 pieces, plus expensive machining.

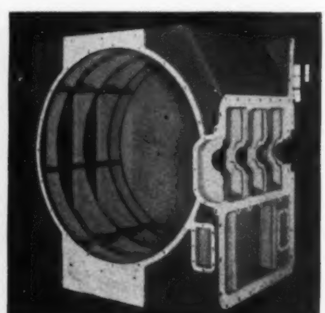

Fig. 7b . . . Same blower housing as that shown at left cost $222 less as a casting than as a welded assembly.

book reviews

Plant Layout

Plant Layout—Planning and Practice . . by Randolph W. Mallick and Armand T. Gaudreau. 391 pp. Indexed. Illustrated with photographs, charts and graphs. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $7.50. (1951).

This practical volume, written primarily for the administrative executive and plant engineer, presents the results of years of actual experience in laying out industrial plants. Covered in the text are complete principles and practice of plant planning and designing; plant layout projects, including re-layouts and new plants; designing of interior facilities such as production and assembly lines, offices, etc.; and an evaluation of capital outlays and operating costs involved.

Non-Ferrous Castings

Non-Ferrous Castings . . by R. F. Hudson. 282 pp., plus appendices. Indexed. Illustrated with photographs, diagrams and photomicrographs. Published by Chapman & Hall, Ltd., 31-37 Essex St., London, W. C. 2, England. $3.08. (1948).

Purpose of this volume is to promote better understanding of non-ferrous casting problems between the practical foundryman and the metallurgist by presenting scientific data to the foundryman concerning non-ferrous metals and fuels, refractories, molding and core sands, molding, melting and gating practices for most standard copper and nickel base alloys.

Steel Castings Handbook

Steel Castings Handbook . . 1950 Edition. 511 pp. Illustrated with photographs, photomicrographs and diagrams. Published by the Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, Ohio. $4.00. (1950).

This outstanding steel castings reference volume, first published in 1941, has been entirely revised and expanded. This edition contains information on types of steel castings, specifications, design considerations, applications, mechanical and physical properties of cast steel and comprehensive technical data covering every phase of the cast steel industry. Some 440 photographs and sketches and 120 tables of essential data illustrate 520 pages of textual material designed for use by all producers and users of steel castings.

Metallurgy and Metallography

Elementary Metallurgy and Metallography . . by Arthur M. Schrager. 297 pp., including glossary and index. Illustrated with charts, graphs, photographs and photomicrographs. Published by The MacMillan Co., College Dept., 60 Fifth Ave., New York, N. Y. $4.75. (1949).

Designed to present metallurgy and metallography to those without engineering training, this book is of value to technicians in almost any field and to workers in the foundry and related industries since it provides a fundamental knowledge of a basic industrial science. This volume covers principles and techniques of modern metallurgy and contains information on characteristics and uses of alloys, from ore extraction to finished product. Also described are principal foundry methods.

health conference

continued from page 43

11:45 a.m.—Discussion.
12:15 p.m.—Adjournment for lunch.
1:30 p.m.—"*Casting Cleaning*," Kenneth M. Smith, Caterpillar Tractor Co., Peoria, Ill.
2:30 p.m.—"*Casting Grinding*," Kenneth Robinson, Michigan Department of Health, Lansing.
3:00 p.m.—Discussion.
3:30 p.m.—Recess.

NON-FERROUS FOUNDRY PROBLEMS

8:30 a.m.—Introduction. A. Burns, Magnus Metal Div., National Lead Co., Detroit.
9:00 a.m.—"*Nature, Manifestations, and Management (Medical) of Lead Poisoning and Metal Fume Fever*," L. E. Hamlin, American Brake Shoe Co., Chicago.
10:30 a.m.—"*Measurement of Lead and Zinc Exposures*," Wm. G. Frederick, Detroit Department of Health.
11:00 a.m.—"*Control of Metal Melting and Pouring Operations*," George Hama, Detroit Department of Health.
11:45 a.m.—Discussion.
12:15 p.m.—Adjournment for lunch.
1:30 p.m.—"*Control of Dust Exposures*," Bernard Bloomfield, Michigan Department of Health, Lansing.
2:30 p.m.—"*Over-all View of Exposures*," Carey P. McCord, University of Michigan. Motion pictures as time permits.
3:00 p.m.—Discussion.

FINAL GENERAL SESSION

4:00 p.m.—Summary and conclusion. Wm. G. Ferrell, Auto Specialties Manufacturing Co., St. Joseph, Mich.
4:30 p.m.—Closing remarks. Presentation of A.F.S. 10-year Safety & Hygiene & Air Pollution Program.
5:00 p.m.—Conference adjourns.

▶ *Show teaching aids at annual FEF conference*

Examining teaching aids made at the University of Michigan are (left to right): Charles W. Briggs, Steel Founders' Society, Cleveland; Richard A. Flinn, University of Michigan; Fred J. Walls, International Nickel Co., Detroit; and Claude B. Schneible, Claude B. Schneible Co., Detroit. The model foundry and take-apart model of a melting furnace were displayed during the annual Foundry Educational Foundation conference at the Statler Hotel, Cleveland, February 14 and 15, when foundrymen and educators discussed casting design and foundry instruction for engineering college students. George K. Dreher, FEF executive director, presided.

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chapter news

Smiling group snapped by photographer Henry Yeager, International Harvester Co., Indianapolis, at Central Indiana Chapter's February 4 meeting included, left to right: Paul Ulmer, Link-Belt Co.; C. T. Marek, Purdue University; A.F.S. National Vice-President I. R. Wagner, H. A. Belz, Purdue University, and Vice-Chairman Carl Schopp, Link-Belt Co.

Northwestern Pennsylvania

EARL M. STRICK
Erie Malleable Iron Co.

Directors' meeting January 28 at the Moose Club, Erie, had as its chairman Fred Carlson, Weil-McLain Co., presiding in the absence of Chairman Douglas C. James, Cooper-Bessemer Corp.

Business taken up at the meeting included a report on the Christmas Party, a report by Treasurer Clyde Cooper, and a talk by A.F.S. National Director Martin J. O'Brien, Jr., Symington-Gould Corp., Depew, N. Y., on the chapter's membership drive results.

The chapter is the eighth in the country to reach its membership quota of 160, Mr. O'Brien reported.

H. F. Scobie, editor, *American Foundryman*, spoke on the value of the "Foundrymen's *Own* Magazine" in keeping foundrymen posted on latest technical developments, and urged that all Northwestern Pennsylvania Chapter members be on the lookout for news material of interest to the entire industry.

Concluding, Earl M. Strick, Educational Chairman, presented a program on foundry education, assisted by cartoonist Bill Snyder of Erie.

Quad City

ERIC WELANDER
John Deere Malleable Works

February 18 meeting, held at the Ft. Armstrong Hotel, Rock Island, Ill., had as its speaker Bruce L. Simpson, National Engineering Co., Chicago, who discussed *"The Development of the Metal Castings Industry."*

The speaker effectively outlined the early stages and growth of our industry, then spoke of the crafts and arts of the middle ages and traced the continuation of foundry practice down to 1896, the year of the organization of A.F.S.

Following Mr. Simpson's talk, a motion picture *"The A-D-M of Cores"* was shown. The film emphasized the need for control in foundry core rooms in order to produce quality products.

Central Ohio

N. H. KEYSER
Battelle Memorial Institute

February 11 meeting had as its guests design engineers from foundries in the area. A record attendance of more than 130 heard William T. Bean, Jr., Detroit foundry consultant, speak on *"Good Casting Design—on Purpose."*

Mr. Bean presented factors involved in design of castings by means of a triangle. One leg of this triangle was knowledge of the metal, which, Mr. Bean pointed out, might be quite different in a casting as compared with a test bar. The second leg of the triangle was design, based on the engineer's best estimation of stresses encountered in service. The final leg was the load that the part must bear in service.

All three legs of the triangle are interrelated so that a change in one must be met by a change in the others. The engineer uses safety factors to compensate for the uncertainties in each step.

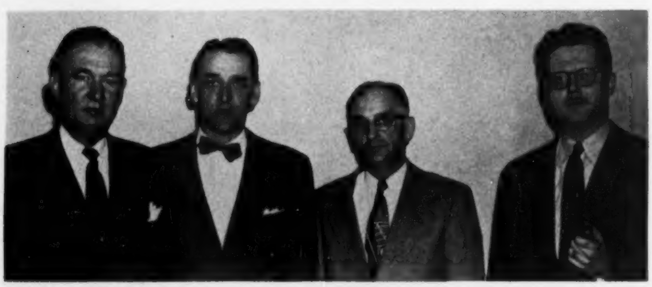
Mr. Bean suggested a new approach to developing the design of a new casting or structure. The essence of this approach is to make a close approximation of the design by the usual stress analysis methods, then make a test structure.

Subject the test structure to the loads

Michigan State College Student Chapter members watching a coremaking demonstration during a visit to Eaton Manufacturing Co.'s foundry, Vassar, Mich., January 21.

At the speakers' table at Ontario Chapter's January 25 meeting were, from left: Vice-Chairman Andrew Reyburn, Cockshutt Plow Co.; Jack King, Archer-Daniels-Midland Co., Toronto, evening's speaker; Chapter Chairman Reginald H. Williams, Canadian Westinghouse, Ltd.; and C. A. Thompson, Galt Malleable Iron Co., Ltd.

Checking over the evening's program at Saginaw Valley Chapter's January 3 meet were, left to right: J. C. McDonald, Dow Chemical Co.; Fred P. Strieter (leaning over) also of Dow; Chapter Chairman Albert Edwards, Chevrolet Grey Iron Div., GMC; and Woodrow Holden, Eaton Mfg. Co. Photo: Ken Priestley, Vassar Electroloy Co.



Caught by chapter photographer Walter V. Napp, Delta Oil Products Co. just before Wisconsin Chapter's January meeting were, left to right: Chapter President George E. Tisdale, Zenith Foundry Co.; "Coffee Talker" D. W. Melton and assistant, Mr. Austin, both of Wisconsin Telephone Co.; and Program Chairman R. V. Osborne, Lakeside Malleable Castings Co.

it will meet in service, he said, and analyze the actual stresses with stress coat and strain gauges. Corrections can then be applied to the structure by adding metal to, or even removing metal from appropriate places.

Because of the similarity between the flow of stresses in a structure and the flow of metal in the mold, foundry problems usually disappear when the stress problems disappear, Mr. Bean said.

Another important advantage of stress analyses on actual structures is that good design can be extrapolated to larger castings, thereby, saving a large amount of effort in design when the need arises to build similar but larger structures, he concluded.

N. Illinois—S. Wisconsin

J. S. ZABEL
Zabel Foundry Sales, Inc.

February 12 meeting opened with a lobster dinner and a short film on *"Trout Fishing in Canada."*

Speaker Edward C. Mathis, Pickands-Mather Co., spoke on *"Operation of the Cupola."* Mr. Mathis first explained the chemical reactions that take place in the cupola and told how the melt is affected by bed height, type of coke and scrap, number and distribution of charges and air flow.

Mr. Mathis further explained the need for good blowing equipment to insure a constant temperature and melting rate.

He concluded by describing various types of mechanical chargers and their effect on flow of air.

January 12 meeting had as its speaker C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, president of the Foundry Equipment Manufacturers' Association.

Mr. Nass outlined plans for the forthcoming A.F.S. International Foundry Congress & Show, Atlantic City, May 1 through 7, and narrated Beardsley & Piper's film, *"Molding Mechanization."*

Missouri School of Mines

JACK H. THOMPSON

February 13 meeting had as its speaker A.F.S. National President Walter L. Seelbach, who told of his recent trip to Europe, where he made arrangements for foundry technical societies to participate in the 1952 A.F.S. International Foundry Congress & Show in Atlantic City, May 1 through 7. Mr. Seelbach also commented on foundry conditions in Europe.

Among recent activities of the Student section was an all-day tour and supper meeting in St. Louis. This tour included East St. Louis Castings Co., General Steel Foundries and Great Lakes Carbon Co. The supper meeting was sponsored by our very generous

and helpful big brothers, the St. Louis District Chapter. We appreciate the help and encouragement given by the St. Louis Section and wish to take this opportunity to thank every one of their members and officers.

Included among the guests at the meeting were: A.F.S. National Director A. L. Hunt, American Brake Shoe Co.; St. Louis District Chapter Chairman Ralph M. Hill, East St. Louis Castings Co.; John Williamson, M. A. Bell Co.; R. Patton, Patton Equipment Co.; National Director L. C. Farquhar, Sr., American Steel Foundries; Jack Culling and Norman Peukert, Carondelet Foundry Co.

Talking shop before Central Illinois Chapter's January 7 meeting were, from left: M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.; speaker H. M. St. John, Crane Co., Chicago; and A.F.S. National Director Frank W. Shipley, also of Caterpillar.

Eastern Canada

A. E. CARTWRIGHT
Crane, Ltd.

January 11 meeting speaker was Jack King, Archer-Daniels-Midland Co., Toronto, who presented the color-sound film, "*The A-D-M of Cores.*"

Mr. King acted as narrator for the film, which deals with the practical application of sand and binder characteristics. He also commented on the sequence of water, cereal and core oil additions to the batch and quoted the differences found in sand green and dry strength resulting from varying the sequence of additions.

Accompanied by comely accordionist Phyllis Holt, A. B. Jackson, III, Electric Steel Foundry Co., Portland, led group singing at Oregon Chapter's Christmas Stag Party, December 14.

Chicago

DEAN VAN ORDER
Burnside Steel Foundry Co.

January Round Table Meeting attracted the largest turnout of the season. The meeting opened with a short film, "*General Safety in the Shop,*" shown courtesy of Burnside Steel Foundry Co.

A.F.S. Northwestern University Student Chapter Chairman Robert Cech invited all Chicago Chapter members to attend a four-week school at Northwestern University. Classes started the second week in February and were held each Wednesday for four consecutive weeks, covering marketing, personnel, plant layout and quality control.

The Gray Iron and Malleable Division under the chairmanship of Cecil F. Semrau, Illinois Malleable Iron Co. had as its speaker, R. P. Schauss of, Werner G. Smith Co., Chicago. Mr. Schauss' topic, "*Foundry Core Practice,*" was of general interest to all the foundrymen.

William L. Rudin, Elesco Smelting Co., served as chairman for the Non-Ferrous Division. The subject, "*Non-Ferrous Patterns,*" was handled very well by Richard Olson, Englewood Pattern Co. Many of the problems confronting pattern makers in the construction of non-ferrous patterns were discussed by the group. The consensus was that many foundry customers could do a lot to simplify casting design, resulting in a lower priced pattern and casting.

The Steel Division, under the chairmanship of Harry Hunt, Pettibone Mulliken Corp., sponsored a presentation and discussion on core blowing. The speakers, Victor Rowell, Archer-Daniels-Midland Co., and L. D. Pridmore, International Molding Machine Co., were well versed on their topic and informed foundrymen of some latest developments in core blowing practices.

With the use of some improved core blowing machines, cores of 500 pounds can be blown very easily. Mr. Pridmore felt that many of the problems encountered in core blowing were due to lack of proper venting. Mr. Pridmore exhibited several types of venting which he felt were very much improved over the old methods.

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Award winners in Southern California Chapter's Apprentice Patternmaking Contest who were honored at the chapter's February 8 meeting were, from left: Phil Campbell, first prize; Donald Bonk, second; Lee Sanders, third; and Peter Meursinge and Donald Kidson, honorable mentions. Photograph courtesy Ken Sheckler, Calmo Engineering Co.

Joint meeting of Texas Chapter and Texas A & M Student Chapter at College Station, Texas, in December featured a tour of the campus and school foundry and a dinner.

Attending a directors' meeting of Toledo Chapter, held in January at the Toledo Yacht Club, were from left: Directors B. J. Beierla, H. Schwab, Vice-Chairman J. G. Blake, Chairman J. A. Mescher, Director J. Cauffiel, Secretary-Treasurer R. C. Van Hellen, Directors Frank Beierla and Wayne Camp, and Publicity Chairman Gerald Grott.

Canton District

WILLIAM T. COLE
Canton Malleable Iron Co.

February 7 meeting subject was "*Non-Destructive Testing with X-Ray and Radium,*" with Royal G. Tobey of Eastman Kodak Co., Rochester, N. Y., speaking.

Using slides, Mr. Tobey presented his talk effectively. The meeting was informative and constructive and apparently the subject appealed to foundrymen of the area, since the chapter had its largest turnout in years—71 members. Chairman C. B. Williams, Massilon Steel Castings Co., presided, with A. O. Prentice, Stark Foundry Co., acting as program chairman.

Metropolitan

WILLIAM T. BOURKE
American Brake Shoe Co.

Approximately 125 foundrymen turned out to hear a long-awaited talk on "*Gating and Risering*" by Howard F. Taylor, Massachusetts Institute of Technology. Technical Chairman was J. S. Vanick, International Nickel Co., who will also serve as chapter chairman for the remainder of the season, substituting for D. F. O'Connor, who has gone to Europe.

Professor Taylor's talk emphasized fundamentals, and he spoke generally of all cast metals.

Fluidity was defined as being the ability of metal to fill a mold completely. For a given metal, fluidity is affected primarily by temperature. The fluidity spiral offers better control than the optical pyrometer, Mr. Taylor said.

Gating systems should be designed to avoid turbulence which results in the entrapment of gases and dirt, causing drossiness and porosity. Some of the techniques recommended to help prevent turbulence were: using the smallest size sprue practicable, avoiding both horizontal and vertical square corners, tapering sprues downward, streamlining pouring basins, progressively decreasing cross-section of runners, and using strainer cores and skim dams.

With regard to risers, the speaker strongly advocated the use of insulating sleeves and riser topping compounds as an effective means of increasing riser efficiency. Interdendritic shrinkage caused by the long solidification range associated with certain metals can be corrected only by the use of chills, he stated.

Northeastern Ohio

ROBERT H. HERRMAN
Penton Publishing Co.

Upton Close, radio commentator and lecturer, addressed 202 members and guests of Northeastern Ohio Chapter of the AFS Jan. 10 at Tudor Arms Hotel, Cleveland. Titling his talk "*The Power Lovers,*" Mr. Close outlined the development of socialism since its inception in Germany in 1776. He discussed inroads it has made in this country and pointed to its influence in recent trends of governmental thinking and acting.

According to Mr. Close, the United States has departed from nationalistic concepts and has become strictly internationalistic, involved in world federation, and save the world plans. This policy, he says, has been fostered by those whose thinking is socialistic.

In concluding, Mr. Close touched upon present corruption in government. He remarked that we have synthetic prosperity because of production for destruction, oiled by corruption. He cited government statistics to illustrate the synthetic prosperity we have: Income of the average American worker in 1941 was $1800. Today it is $3000. What

Harry E. Gravlin, Ford Motor Co., Dearborn, Mich., uses a defective casting to point up his talk on "*Sand, Metal and Men*" at Michiana Chapter's February 11 meeting.

the average American does not seem to realize, however, is that today's $3000 represents 6 per cent lower purchasing power than the $1800 in 1941, according to the government's cost of living index.

Tri-State

ERIC WELANDER
John Deere Malleable Works

More than a hundred foundrymen and guests braved snow, sleet and slippery streets to hear H. K. Briggs, Miller & Co., Chicago, on "*Cupola Practice.*"

Mr. Briggs discussed many of the important phases of cupola operation from both a technical and practical viewpoint. He also brought out the advantages and disadvantages of variations in cupola construction, such as balanced blast, front slagging cupolas, etc. The basic lined cupola was also described briefly.

The importance of obtaining more information with respect to slag composition and formation both in basic and acid lined cupolas was emphasized.

Martin Liedtke, Farmall Works, International Harvester Co., served as technical chairman.

A. J. "Butch" Stolfa, Director of Athletics, Davenport High School, gave an interesting "coffee talk" preceding the technical session.

Twin City

J. D. JOHNSON
Archer-Daniels-Midland Co.

Particularly successful January 8 meeting drew 99 foundrymen to hear L. J. Voros, Caterpillar Tractor Co., Peoria, Ill., speak on "*Coreblowing in a Semi-Production Foundry.*"

Among the many area patternmakers and core room personnel present were 21 men from American Hoist & Derrick Co. and 12 from Northern Malleable Iron Co.

Mr. Voros outlined three basic rules for successful coreblowing: (1) cooperation among design, pattern and core departments, (2) imagination and ingenuity in core box rigging, and (3) accurate control of core sand mixes.

Core sand moisture is a critical factor in coreblowing, Mr. Voros said. Moisture must be greater than 1.8 per cent or the mixture will have an abrasive action on the core box and plug vents and the formed green cores will have soft spots. Too much moisture in a core mix (more than 2.5 per cent) renders it difficult to blow, and green cores will not have sufficient green strength, he added.

Following the talk, the group split into two sections. The first, on cores and coreblowing, was led by Nathan Levinsohn, Minneapolis-Moline Co., and the other, on "Casting Design and Heat Treatment of Iron Castings," was led by Herman Rischall, American Hoist & Derrick Company.

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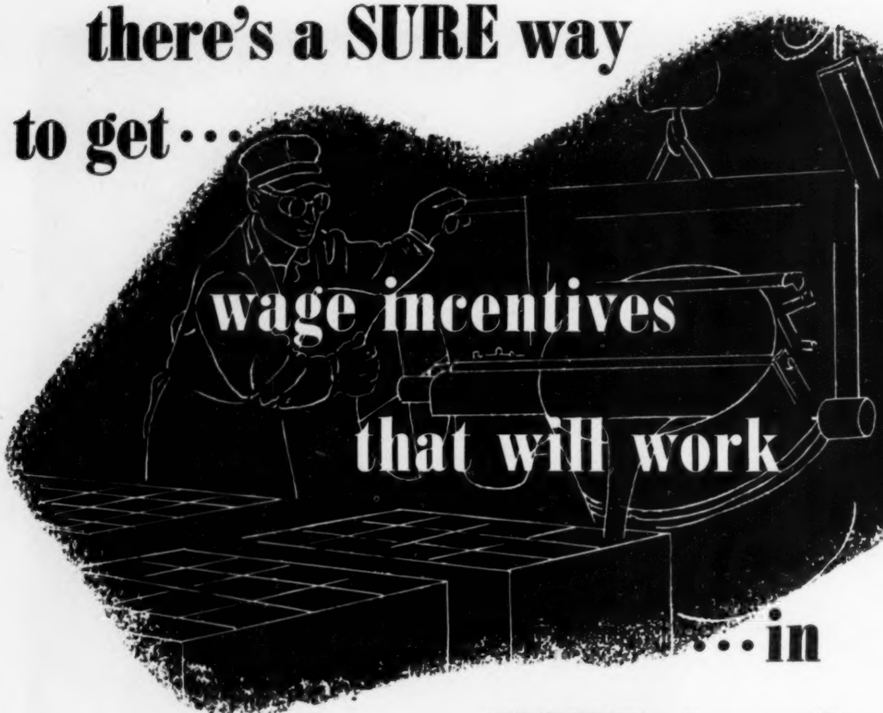
Picture of relaxation before Birmingham District Chapter's January meeting were, left, Chapter Vice-Chairman Fred K. Brown, Adams, Rowe & Norman, Inc., and E. E. Pollard, Alabama Pipe Co., Anniston, Ala., who spoke on "*Mechanized Cupola Operation.*"

Arranging last-minute details for Central Indiana Chapter's January 7 meeting were, left to right: Chairman Robert Spurgin, III, Swayne Robinson Co.; Technical Chairman Dallas Lunsford, Perfect Circle Corp.; and W. W. Levi, Lynchburg Foundry Co., Radford, Va., who spoke before the chapter on "*Cupola Practice and Operations.*"

Headliners at Northwestern Pennsylvania Chapter's January 28 meeting were, left to right: Vice-Chairman Fred Carlson, Weil-McLain Co.; A.F.S. National Director Martin J. O'Brien, Jr., Symington Gould Corp., Depew, N. Y.; principal speaker Fred G. Sefing, International Nickel Co., New York, also a National Director; H. F. Scobie, editor, American Foundryman.

there's a SURE way to get . . .



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INCENTIVES that result in maximum unit production at a profit should be specially designed to work in a foundry and, more important, to meet your own particular requirements.

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chapter news

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Tri-State

J. G. Winget
Reda Pump Co.

Guest speaker at the January meeting was Elmer C. Zirzow, Werner G. Smith Co., Cleveland, who discussed "*Casting Defects.*" Meeting, held at Bartlesville, Okla., had a near-record turnout, justifying the chapter's policy of spreading its meetings over the chapter area.

Speaking on sand properties and their effect on defective castings, Mr. Zirzow advanced several theories, which if not revolutionary, were certainly new to the audience. Among these was Mr. Zirzow's contention that pin-hole porosity in gray iron castings is most likely caused by excessive permeability in the molding sand.

Texas A & M College

W. E. Johnston

Joint meeting of the A.F.S. Texas Chapter and Texas A & M College Student Chapter, held December 7 on the Texas A & M campus, was a triple feature program.

First event was a campus tour and a pouring demonstration in the college foundry. Instructor M. W. Watson supervised the demonstration.

Second on the program, providing a recreational break in the day's activities, was a bowling session in the Student Center.

Climaxing the day's program was a banquet and technical meeting, with Prof. Lloyd G. Berryman speaking on "*Air Preheated Unit for Small Cupolas Aids Melt Efficiency,*" a paper that appeared in the November, 1951, issue of

C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, holds set of souvenir cast book ends given him by the Detroit Chapter in appreciation of his talk on "*Mechanization in Molding,*" January 21.

American Foundryman. Also speaking on the program was Scholarship Student C. D. Adickes, who discussed the current shortage of engineers in industry.

Last on the program was a showing of a film depicting the recent, disastrous failure of the Tacoma Narrows Bridge.

Michigan State College

C. C. Sigerfoos
Faculty Sponsor

Eaton Manufacturing Co., Vassar, Mich., was host to 35 members of the Student Chapter January 21 on a comprehensive plant tour and a dinner.

Company officials were hosts at a chicken dinner given at Fischer's Hotel, Frankenmuth. Eaton's personnel director, Paul Olsen, introduced the company's technical staff and gave a brief history of the firm, in which he pointed out that Eaton is the world's largest producer of castings made from iron molds.

After dinner, a complete foundry tour took on such interesting operations as the mold layout and machining department, where thousands of castings are produced from a set of iron molds mounted on a merry-go-round casting machine.

Also of special interest were the hot blast, front slagging cupolas and a newly installed pneumatic core sand delivery system that blows core sand from the mixing machines to hoppers located directly above the coremaking machine.

MIT

Dix Chandley

December 5 meeting speaker was E. I. Valyi, Shell Molding Machine Co. of New York, who discussed major developments and research programs in shell molding.

New developments, according to Dr. Valyi, are: (1) any sand is suitable for resin bonding, (2) gating and risering techniques differ greatly from those used in conventional sand molding, i.e., gates must be adjusted to pattern flow because hot metal burns the resin as it enters the mold, so that any splash of metal causes rough surface, and (3) metal remains fluid much longer in a shell mold because of the mold's excellent insulating properties, which acutely affect risers, sprues and gates.

Ontario

C. A. Thompson
Galt Malleable Iron Co.

January 25 meeting at the Connaught Hotel, Hamilton, was divided into three group discussions.

Cast Iron Group, with C. Maddick, Massey-Harris Co., as chairman, had as its speaker Roy W. Bennett of Hydro-Blast Corp., Chicago, who discussed *"Sand Reclamation."*

Malleable Group, headed by C. Thompson, Galt Malleable Iron Co.,

Audience participation brought down the house when George Bogue, General Tool Co., imitated a one-man German band, assisted by ersatz Scotsman Melchert of Gas Heat Co. (in kilts) at Oregon Chapter's Christmas Party. Photo by Norman Hall, Electric Steel Foundry Co.

heard discussion of malleable foundry problems led by Ralph Green, Semet-Solvay Co., Detroit.

Chairman Frank Diana, Wagman & Son, Ltd., supervised a panel discussion on non-ferrous founding. Panel members were: G. M. Johnston Neptune Meters, Ltd.; W. A. Jones, Canadian Westinghouse Co., Ltd.; Len Humphreys, A. H. Tallman Bronze Co.; and J. W. Bell, Aluminum Co. of Canada, Ltd.

Out of a total chapter membership of 330, 225 attended this meeting.

Western Michigan

C. H. Cousineau
Carpenter Bros., Inc.

January 7 meeting, "Management Night," was attended by 120 members and their guests. Speaker was A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, who discussed the *"Relationship of Pattern to Castings."*

Mr. Pfeiffer described how patterns are frequently constructed wrongly because of lack of cooperation between pattern shop and foundry in the design of patterns. The speaker recommended the use of models to facilitate making patterns right the first time and showed several interesting ways to increase production on small plate-rigged jobs.

Chapter Vice-Chairman William Cannon, Nugent Sand Co., introduced the speaker. Chapter Chairman Ross P. Shaffer, Lakey Foundry & Machine Co., led discussion of Mr. Pfeiffer's paper.

February 4 meeting speaker was V. A. Crosby, Climax Molybdenum Co.,

Detroit, whose topic was *"Factors Affecting the Physical Properties of Gray Iron."*

Mr. Crosby told of the effects of various alloying elements on the physical properties of gray iron, and of how varying amounts affect properties of test bars and castings.

Michiana

A. J. RUMELY, JR.
LaPorte Foundry Co.

February meeting speaker Harry E. Gravlin, Ford Motor Co., Dearborn, Mich., gave the 100 members present an extremely interesting hour when he discussed *"Sand, Metal and Men."*

Using a defective casting as a prop, Mr. Gravlin made the audience analyze the possible reasons for its defects.

Central Indiana

PAUL V. FALK
Electric Steel Castings Co.

January 7 meeting, held at the Athenaeum, Indianapolis, heard W. W. Levi, Lynchburg Foundry Co., Radford, Va. on *"Cupola Practice and Operation."*

Mr. Levi's talk, one of the most interesting the chapter has heard in a long time, roused so much enthusiasm that members kept him on the platform answering questions until midnight.

Membership Chairman Lee Edwards reported a successful membership drive, and the Educational Committee reported progress on work with high schools.

Detroit

R. GRANT WHITEHEAD
Claude B. Schneible Co.

Largest gathering of the season turned out to hear C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, narrate his company's new film *"Mechanization in Molding."*

Honored at the meeting, which was "Sustaining Members' Night," were representatives of Sustaining Member companies: Harold McMurray, Ford Motor Co.; G. L. Galmish, Michigan Malleable Iron Co.; Walter Kantzler, Kelsey-Hayes Wheel Co.; L. Carl Beers, Claude B. Schneible Co.; and George C. Collingwood, Pontiac Motor Div., General Motors Corp.

E. W. Gerhard, Jr., Swedish Crucible Steel Co., was named membership chairman, succeeding Crary Davis, who resigned.

Central Illinois

G. F. LLOYD
Brass Foundry Co.

January 7 meeting, held at the American Legion Home, Peoria, was attended by 70 members.

Technical Chairman G. F. Lloyd, Brass Foundry Co., introduced the speaker of the evening, Harry M. St. John, Crane Co., Chicago. Mr. St. John's subject was *"Metal Losses and Metal Balance in the Brass Foundry,"* in which he explained how, with proper

controls in melting and molding departments, metal loss can be greatly decreased for each pound of good castings sold.

One of the best controls of foundry scrap, in his opinion, is a daily scrap sheet that gives a foundry foreman statistics on the scrap history of each job reordered from the foundry.

Oregon

NORMAN E. HALL
Electric Steel Foundry Co.

Setting aside the tools of their trade for an evening of refreshments, dinner and entertainment, approximately 170 foundrymen, suppliers and guests gathered at the Heathman Hotel December 14 for the Annual Christmas Stag Party.

Through the generous support of many firms serving the industry, those in attendance were treated to a full two-hour floor show and throughout the evening were accompanied in group singing by a talented accordionist.

Chairman Louis La Grand, La Grand Industrial Supply Co., was assisted in arranging one of the best parties put on by the chapter by James Brodigan, Columbia Steel Casting Co.; George Vann, Northwest Foundry & Furnace Co.; M. O. Woodall, Rich Manufacturing Co.; and by James Dorigan and William Halverson, both of Electric Steel Foundry Co.

The chapter is hard at work on plans for the Northwest Regional Conference, to be held in Portland on October 24 and 25. Conference Chairman W. R. Pindell, Northwest Foundry & Furnace Co., has his committees selected and functioning and the chapter extends an invitation to all interested foundrymen to attend the conference this fall.

Central Michigan

RICHARD H. DOBBINS
Albion Malleable Iron Co.

Regular monthly dinner meeting was held at the Hart Hotel, Battle Creek, the evening of January 16.

Chairman Thomas T. Lloyd presided at the business meeting. Mr. Lloyd in turn introduced Frank Rote, also of Albion Malleable Iron Co., who acted as technical chairman for the meeting.

Mr. Rote introduced as the guest speaker of the evening Dr. Richard A. Flinn, professor of Metallurgy at the University of Michigan, who also spoke on *"Ductile Iron."* In his talk he gave a complete picture of his work with ductile iron, showing properties of the material and the manufacturing problems involved. A short question session followed the meeting.

Philadelphia

ARTHUR A. THUM
Palmyra Foundry Co.

January 11 meeting opened with a short talk by A.F.S. National Director Frederick G. Sefing, International

Nickel Co., New York, on the program of the forthcoming International Foundry Congress & Show in Atlantic City.

Principal speaker was William Morley, Link-Belt Co., Olney Foundry Division, Philadelphia, who presented a talk on "*Is Mechanization of Your Foundry Practical?*" Mr. Morley's talk was taken from his A.F.S. Exchange Paper to the 1951 International Foundry Congress in Brussels.

Each shop has its own mechanization problems, the speaker said, because of differences in types of metal poured and whether it is a production or jobbing foundry. Mechanization nevertheless has the same effect in all foundries, Mr. Morley said—lower costs, increased production, conservation of manpower, better working conditions and improved casting quality.

Chesapeake

JOSEPH O. DANKO, JR.
Arlington Bronze & Aluminum Corp.

More than 350 hungry foundrymen and their friends consumed seven full barrels of oysters—fried, stewed, frittered and on the half shell—at the chapter's Annual Oyster Roast, held January 12 in Baltimore.

Held at the Alcazar, the Roast was managed by A. A. Hochrein, American Smelting & Refining Co., and his battery of ticket sellers.

An occasional barber shop quartet, plus a three-piece band, added a musical note to the festivities.

Northwestern Pennsylvania

ROY A. LODER
Erie Malleable Iron Co.

January 28 meeting drew a crowd of more than 100 members and guests, including A.F.S. National Directors Martin J. O'Brien, Jr., Symington-Gould Corp., Depew, N. Y., and Frederick G. Sefing, International Nickel Co., New York; and H. F. Scobie, editor, American Foundryman. Mr. Sefing discussed "*The Foundry's Responsibility in an Educational Program.*"

Meeting opened with a showing of the "*Brass Trail,*" a sound-color film made by a British Brassfoundry Productivity Team of its visit to non-ferrous foundries in this country two years ago.

First speaker, H. F. Scobie, told of the part that American Foundryman plays in keeping foundrymen technically informed on latest developments in the foundry industry. He urged that readers write letters to the editor and short technical articles to add their knowledge and experience to the pool of foundry information.

Educational Chairman Earl M. Strick, Erie Malleable Iron Co., introduced the main speaker, Mr. Sefing, who told of the need for an educational program in foundries. According to Mr. Sefing, a foundry with the most up-to-date equipment has no production if there is no skilled help to operate it.

coming events

March

17 . . Quad City
Fort Armstrong Hotel, Rock Island, Ill. Ralph L. Lee, General Motors Corp., Detroit. *"Science of Humanics."*

17 . . Northern California
Hotel Shattuck, Berkeley. Hiram Brown, Solar Aircraft Co., Des Moines. *"Light Alloy Foundry Practice."*

18 . . Eastern New York
Circle Inn, Lathams, N. Y. C. A. Robeck, Gibson & Kirk Co., Baltimore. *"Non-Ferrous Foundry Practice."*

18-19 . . Steel Founders' Society
Annual Meeting, Edgewater Beach, Chicago, Illinois.

19 . . Central Michigan
Hart Hotel, Battle Creek. C. T. Greenidge, Battelle Memorial Institute, Columbus. *"Research in the Foundry."* Harry W. Dietert, Harry W. Dietert Co., Detroit. *"The Place of A.F.S. in Industry."*

20 . . Washington
Frye Hotel, Seattle. Hiram Brown, Solar Aircraft Co., Des Moines. *"Light Metal Practice."*

28 . . Chesapeake
Engineers' Club, Baltimore. Louis H. Gross, American Radiator & Standard Sanitary Corp., Baltimore. *"Cupola Controls and Operation."*

28 . . Ontario
Royal Connaught Hotel, Hamilton. Group meetings.

31 . . Metropolitan
Essex House, Newark, N. J. C. A. Burgess, Gray Iron Founders' Society, Cleveland. *"Design for Castings."*

31-April 2 . . AIMME
Hotel William Penn, Pittsburgh. National Open Hearth Conference.

April

1 . . Rochester
Seneca Hotel, Rochester. Donald Lavelle, Federated Metals Division, American Smelting & Refining Co. *"Aluminum."*

7 . . Chicago
Chicago Bar Association. Werner B. Bishop, Archer-Daniels-Midland Co. *"The Control of Core Production."* Film: *"The ADM of Cores."*

7 . . Central Indiana
Athenaeum Turners, Indianapolis. H. Bornstein, Deere & Co., Moline, Ill. *"Ferrous Metallurgy & Foundry Practice."*

7 . . Central Illinois
American Legion Post No. 2, Peoria, Ill. W. R. Jaeschke, Whiting Corp., Harvey, Ill. *"Malleable Melting and Heat Treatment."*

7 . . Twin City
Covered Wagon, Minneapolis. W. W. Levi, Lynchburg Foundry Co., *"Cupola Operation."*

10-11 . . Malleable Founders' Society
Case Institute of Technology, Cleveland. Market Development Conference.

11 . . Southern California
Rodger Young Auditorium, Los Angeles. Donald McCutcheon, Ford Motor Co., Dearborn, Mich. *"Non-Destructive Testing."*

11-12 . . University of Michigan
University of Michigan, Ann Arbor, Mich. Protection in Foundry Practice Conference.

12 . . Eastern New York
Circle Inn, Lathams, N. Y. Roger W. Clark, General Electric Co., Schenectady, N. Y. *"Welding."*

14 . . Central Ohio
Seneca Hotel, Columbus, Ohio. George Anselman, Beloit Foundry Co., Beloit, Wis. *"Casting Defects."*

14 . . Philadelphia
Engineers Club, Philadelphia, Pa. Brass & Bronze Educational Course. B. A. Miller, moderator.

14 . . Northern California
Hotel Shattuck, Berkeley, Calif. Donald McCutcheon, Ford Motor Co., Dearborn, Mich. *"Non-Destructive Testing."*

April

14 . . Western New York
Sheraton Hotel, Buffalo, N. Y. Dr. Douglas C. Williams, Ohio State University, Columbus. *"A Correlation of the Educational Program & Foundry Practices."* Film: *"The A-D-M of Cores."*

17 . . Washington
Frye Hotel, Seattle. Donald McCutcheon, Ford Motor Co., Dearborn, Mich. *"Non-Destructive Testing."*

18 . . Eastern Canada
Mt. Royal Hotel, Montreal. Quiz Night: *"Problems in the Cleaning Room."*

18 . . Texas
Afternoon: Plant Visits to Texas Foundries, Inc. and Lufkin Foundry & Machine Co., Lufkin, Texas. Evening: Angelina Hotel, Lufkin. Harry W. Dietert, Harry W. Dietert Co., Detroit. *"Analyzing Foundry Problems."*

24-25 . . Time Study & Methods Conference
Hotel Statler, New York. Sponsored by Society for Advancement of Management.

26-May 11 . . Liege International Fair
Liege, Belgium.

27-May 1 . . American Ceramic Society
Annual Meeting, William Penn Hotel, Pittsburgh.

29-30 . . Metal Powder Association
Drake Hotel, Chicago. *"Powder Metallurgy in a Defense Economy."*

May

1-7 . . Intl. Foundry Congress & Show
Atlantic City, N. J.

5-6 . . National Air Pollution Symposium
Huntington Hotel, Pasadena, Calif. Sponsored by Stanford Research Institute, California Institute of Technology, University of California at Los Angeles, and the University of Southern California.

13 . . Rochester Chaper
Seneca Hotel, Rochester, N. Y. Election of officers.

13 . . Chicago
Chicago Bar Association, Round Table Meeting.

14-16 . . Stress Analysis Conference
Hotel Lincoln, Indianapolis, Society for Experimental Stress Analysis.

19 . . Central Indiana
Athenaeum Turners, Indianapolis. George Anselman, Beloit Foundry Co., Beloit, Wis. *"Molding & Core Sands."*

22-24 . . Amer. Soc. for Quality Control
Onondaga County War Memorial Auditorium, Syracuse, N. Y. Sixth Annual Convention.

June

16-17 . . Malleable Founders' Society
Homestead Hotel, Hot Springs, Va. Annual Meeting.

23-27 . . Am. Soc. for Testing Materials
New York. Annual Meeting.

September

8-10 . . American Standards Association
Museum of Science & Industry, Chicago. National Standardization Conference.

October

16-17 . . Gray Iron Founders' Society
Hotel Cleveland, Cleveland. Annual Meeting.

16-18 . . Foundry Equipment Mfrs. Assn.
The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.

17-18 . . Michigan Regional Fdy. Conf.
University of Michigan, Ann Arbor. Sponsored by AFS Central Michigan, Western Michigan, Detroit and Saginaw Valley Chapters and AFS Michigan State and University of Michigan Student Chapters.

20-24 . . American Society for Metals
Philadelphia. National Metal Congress and Exposition.

25-26 . . Northwest Regional Fdy. Conf.
Multnomah Hotel, Portland, Oregon. Sponsored by the Oregon, Washington, and British Columbia Chapters and the Oregon State College Student Chapter.

abstracts

Metallurgical Chemicals

A174 . . Actual Research Data. E. Piwowarsky, "On Chemicals Used for Protecting, Cleaning, Degasing, Desulphurizing, and for Prevention of Shrinkhole Formation in Non-Ferrous Metals, Cast Iron and Steel," *Giesserei*, vol. 38, September 6, 1951, pp. 417-422. (In German)

A survey is made of substances used in the foundry of light and heavy metals for the purposes of eliminating undesirable ingredients from the melt, protecting the latter's open surface, eliminating gases and sulphur, and preventing formation of shrinkholes. The survey is supplemented by data from the author's experiments with steel and cast iron, such as those on the improvement of magnesium-rich alloys through the addition of cast-iron cuttings, and on the partial replacement of iron oxides by copper oxides.

Casting Brass Continuously

A174 . . Speeds Strip Mill Rolling. D. L. Brown, "Continuous Casting Revolutionizes the Brass Industry," *The Iron Age*, vol. 168, September 6, 1951, pp. 106-108.

The continuous casting of slabs, permitting continuous strip mill rolling, has revolutionized the brass industry. A description is presented of a continuous casting machine, now known as the Rossi machine. This slab machine will cast 25½ x 2½-in. slabs satisfactorily up to a rate of at least 20 ipm. The accuracy or overall tolerance of the slabs is found to be amazingly uniform, the high and low tolerance on thickness averaging 0.060 in. and the maximum width tolerance 0.050 in. The only remaining problem is supplying enough molten metal to the casting machine to take full advantage of the increased slab-making capacity.

Die Castings Evaluation

A175 . . Reviews Pertinent Facts. T. C. Du Mond, "Die Castings," *Material and Methods*, August 1951, pp. 83-98.

A review is given of the pertinent facts about die castings, their inherent advantages, and the widening list of alloys from which they can be made. The methods used in the production of die castings are described. The mechanical, physical, and chemical properties of some of the more common materials used in their fabrication are discussed, covering alloys of zinc, aluminum, magnesium, copper, lead, and tin. The relative advantages and fields of application of each are described. Other sections cover the comparison of die castings with other fabricated forms, some important principles of die casting, and various processes for finishing the castings, including mechanical, electrochemical, and chemical finishes.

AFS Introduces

continued from page 69

Michiana

Robert I. Burger, Melting Fmn., *Auto Specialties Mfg. Co.*
James E. Digan, Pres., *James E. Digan Sales Corp.*
Charles Rakauski, Asst. Supt., *Auto Specialties Mfg. Co.*
Francis L. Storer, Supt., *Auto Specialties Mfg. Co.*

Mo-Kan

Les C. Parrish, Fdy. Supt., *J. B. Ehrsam & Sons Mfg. Co.*
C. R. Tayerle, Asst. Dist. Sls. Mgr., *Pickands Mather & Co.*
E. F. Whitfill, Owner, *Whitfill Pattern Works.*

Northeastern Ohio

William N. Brammer, Asst. Sales Mgr., *Apex Smelting Co.*
Kenneth D. Carter, Student, *Case Institute of Technology.*
James W. Hamblen, Sales Engr., *Apex Smelting Co.*
James D. Morgan, Fmn., *Superior Foundry, Inc.*
Raymond Rolf, Sales Engr., *Ohio Crankshaft Co.*
William A. Sanders, Student, *Case Institute of Technology.*
Allan Richard Volmar, Student, *Case Institute of Technology.*
John Walsh, Sales Engr., *Apex Smelting Co.*

Northern California

Alexander Woodside, Sales, *Pacific Brass Foundry*

N. Illinois & S. Wisconsin

Leon Johnson, Asst. Molding Fmn., *Beloit Iron Works.*
Robert H. Miller, Mgr., *Ebaloy Foundries, Inc.*

Ontario

L. J. Allan, Sales, *Upton Bradeen & James, Ltd.*
William Bain, Fmn., *John T. Hepburn, Ltd.*
Jack Bell, *Otaco Limited.*
G. Bruce Colton, Supt., *General Smelting Co. of Canada, Ltd.*
William G. Daniels, Supt., *A. H Tallman Bronze Co, Ltd.*
Robert Holland, Works Mgr., *Dominion Wheel & Foundries, Ltd.*
R. J. Phoenix, Chief Insp., *Dominion Foundries & Steel Ltd.*
Jack Ramsden, Pres., *Ramsden Mfg. Ltd.*
Neville S. Spence, Sales Mgr., *Dominion Magnesium Ltd. & Light Alloys, Ltd.*
John Williams Wallace, Prof. Engr., *Canadian Westinghouse Co. Ltd.,*

Oregon

Robert M. Burns, Fdy. Mgr., *Pacific Chain & Mfg. Co.*
Conrad F. Hein, Molder, *Rich Mfg. Co.*
Gunnar Lund, Supt. of Fdy. *Pacific Chain & Mfg. Co.*

Philadelphia

A. Fred Westburgh, *Tiona Petroleum Co.*
Albert B. Bates, Agent, *Spencer Turbine Co.*
Norman H. Halliday, Experimental Engr., *Bethlehem Steel Co.*
William N. Rice, Chief Inspector, *Bethlehem Steel Co.*
Frank P. Spangler, Sales Repr., *Master Pneumatic Tool Co., Inc.*
John F. Weber, Salesman, *E. F. Houghton & Co.*

Quad City

John C. Lunkes, *Kordell Industries.*
Edwin Lundstrom, Molding Fmn., *John Deere Malleable Co.*

Rochester

Alfred Pica, Rochester, *Erie Foundry.*

St. Louis District

Charles Delfel, Fdy. Mgr., *Nordberg Mfg. Co., Busch Sulzer Bros., Diesel Engines.*
Robert C. Kenyon, Fdy. Supt., *Lewin-Mathis Co.*
Robert E. Peppers, Asst. Met., *Key Co.*

Southern California

Clifton C. Cassity, Supt., *Pioneer Tool Engineering, Inc.*
Harold F. Meyer, Sales Engr., *Laclede-Christy Co.*

Tennessee

Edgar Bryant, Jr., Fdy. Sand Tech., *Mueller Co.*
Coy E. Jones, Asst. Foundry Fmn., *Mueller Co.*
Hood Longley, Core Room Fmn., *Mueller Co.*
Raymond R. Lowry, District Sales Mgr., *A. P. Green Fire Brick Co.*
Fred C. Nunne, Plant Engr., *U. S. Pipe & Foundry Co.*
Clyde L. Slater, Brass Fdy. Fmn., *Mueller Co.*
Dorsey White, Group Leader, Core Room, *Mueller Co.*

Texas

David K. Mc Kie, Personnel Mgr., *Tyler Pipe & Foundry Co.*
Joe E. Satterwhite, Asst. Maintenance Supt., *Sollberger Engineering Co., Inc.*
Robert E. Smith, Secy-Treas. *Sollberger Engineering Co., Inc.*
Thomas V. Stewart, Plant Supt., *Tyler Pipe & Foundry Co.*

Toledo

Frank J. Collins, Acc. Fmn., *Bunting Brass & Bronze Co.*
A. G. Edwards, Fdy. Follow-up & Checker, *National Supply Co.*
L. E. Fischer, Fmn., *Bunting Brass & Bronze Co.*

Tri-State

Walter T. Beyer, Vice Pres. *Kastalloy Co., Inc.*
Eugene G. Maschino, Secy-Treas., *Kastalloy Co., Inc.*
A. E. Perry, Fdy. Fmn., *Nelson Electric Mfg. Co.*

Twin City

Earl C. Juhl, Chief Inspector, *Minneapolis Electric Steel Castings Co.*
George Stromquist, Core Room Fmn., *Minneapolis Electric Steel Castings Co.*
Thomas T. Thomalla, Fdy. Supt., *J. F. Quest Foundry Co.*

Washington

Thomas F. Meagher, District Mgr., *Laclede Christy Co.*
E. F. Riedle, Leading Molder, *Puget Sound Naval Shipyard.*
Richard G. Wagner, Jr., *Puget Sound Naval Shipyard.*

Western Michigan

Russell H. Cashbaugh, Layout Supv., *Lakey Foundry & Machine Co.*
Gillis Van Sluys, Fmn., *American Seating Co.*
William Vellenga, Supv., *Lakey Foundry & Mach. Co.*
Louis W. Wessel, Melting Supv., #6 Plant, *Campbell, Wyant & Cannon Fdy. Co.*

Western New York

Gerrit H. Pool, Salesman, *Debevoise Anderson Co.*

Wisconsin

Warren L. Borchardt, Mold Supv., *Grede Foundries, Inc.*

Wisconsin (continued)

Carl F. Bufka, Asst. Prod. Mgr., *Grede Foundries, Inc.*
Anton Dexheimer, Fmn. Molding, *Brillion Iron Works, Inc.*
Victor Joseph Draeger, Standards Dept., *Milwaukee Steel Div., Grede Fdies.*
William Hamp, Labor Fmn., *Grede Foundries, Inc.*
Felix R. Kuskie, Steel Furnace Operator, *Pelton Steel Casting Co.*
Harold H. McCabe, Met., *Lakeside Malleable Castings Co.*
James Nevenhoven, Gen. Fmn.—Core, *Brillion Iron Works, Inc.*
Harold Ootenstein, Fmn. Sand Control, *Grede Foundries Inc., Milwaukee Steel Div.*
August Poeppel, Asst. Cupola Fmn., *Grede Foundries, Inc.*
Louis A. Schultz, Maintenance Supv., *Grede Foundries, Inc.*
Meyer Schwartz, Vice-Pres., *Wisconsin Aluminum Fdy. Co., Inc.*
Robert D. Wood, Sr. Industrial Engr., *Harnischfeger Corp.*

Michigan State College

Alan R. Rosenfield
Sat Brat Gupta
D. G. Triponi
Paul Gene Barnard
Jack H. Humphrey
Kenneth L. Cramer
Denver Stuart Patton, Jr.
Paul J. Hausner
Ronald Rex
F. William Reed
Ivan C. Burket
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Philip Joseph Hardoci
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University of Michigan

Gopal Prasad Agarwal
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Sumio Yukawa
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Leonard Martin, Jr.
Ernie B. Mikus
James Pappas
John P. Rowe
John C. Shyne
Ralph J. Stuiligross
Muir Carl Tarlo
R. P. Wegter
Darwin Bruce Wile
A. J. Terry Brown, Jr.
Edwin H. Corlett
Raymond F. Decker
David A. Guttentag

continued on following page

U. of Michigan (continued)

Rudolph Jackowski
Phillip Elmo Lunetta
James W. Morse, Jr.
Osborn E. Moore, Jr.
Stanley I. Pinel, Jr.
Edward P. Sattelberger
Rodney Lee Sonnenberg
Wm. Strickler
Roger R. Vogel
David F. Weigel
James Arthur Woodard

International

England

Nirendra Nath Banerjee, Student, *National Foundry College, Wolverhampton.*
Asit Kumar Ghosh, Student, *National Foundry College, Wolverhampton.*
Frank Horton, Student, *National Foundry College, Wolverhampton.*
Haakon Kauserud, Student, *National Foundry College, Wolverhampton.*
Raymond John Shelton, Student, *National Foundry College, Wolverhampton.*

Germany

George August Hans Jungbluth, Prof., *Technical University, Karlsbrun/Baden.*

Japan

Y. Amari, Director, *Hitachi Limited, Chibaken.*
Tokushichi Mishima, Prof. of Met., *University of Tokyo, Engr. Dept., Tokyo.*
H. Nakamura, Dr. of Engineering, *Ishikawajima Heavy Ind. Co., Ltd., Chuoku, Tokyo.*
Goyo Ohiro, *Institute of Met. Engrg. Tohoku University, Komegafukuyo, Sendai.*
Tatsuo Tanaka, Chief of Casting Dept., *Government Mech. Lab., Sumiyoshicho Suginami-ku, Tokyo.*

▶ *Die Casting Award*

■ American Die Casting Institute, New York announces that Doehler-Jarvis Corp., an Institute member, has donated $25,000 for the establishment of a perpetual trust to be known as the Annual Doehler Award Fund.

The Award will be made annually for the outstanding contribution to the advancement of the die casting industry as represented by technical achievement, advancement in plant operation or by other activities not primarily of a scientific or operational nature.

The Award will consist of a suitable plaque and a cash honorarium of $500, or more if the income of the Fund permits at the discretion of ADCI. All contributions are to be evaluated basically on the applicability of the contribution to the industry as a whole.

Any individual, group of individuals, technical or scientific society or committee thereof is eligible, regardless of whether it is engaged in the die casting business or is a member of the Die Casting Institute. The American Die Casting Institute's Board of Directors will comprise the Award Committee.

Foundry Information

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research and devolpment department Bulletin is profusely illustrated with photographs and drawings. *Babcock & Wilcox Co.*

326 Using shot and grit

"A Primer on the Use of Shot and Grit" examines blast cleaning operations in question and answer form. The differences between chilled iron and annealed abrasives are clearly shown in its 16 pages. *Hickman, Williams, & Co.*

327 Production control

Fifty-six-page book, "Production Control Systems and Procedures", details a method of materials control that results in a shorter production planning cycle while speeding production by eliminating causes of various delays on the line. Fully illustrated with typical forms and procedure charts, the book outlines complete procedures for engineering, production planning and progress, machine load, material and tool procurement and control. Included is a typical case history. *Remington Rand Inc.*

328 Liquid core binder

Highly concentrated liquid core binder that migrates to the surface of the core during baking is explained in 4-page bulletin. Cores with harder surfaces and edges are produced that resist metal penetration, veining, and that reduce cleaning costs. Core center is left relatively soft. Shake-out time and labor have in some cases been reduced by 80 per cent. Binder is called Tykor; it bakes 20 to 40 per cent faster, depending on the amount of core oil replaced. It works with synthetic resins and all types of sand. *Swan-Finch Oil Corp.*

329 Double auger tuyeres

Cupola tuyeres that impart a twisting motion to the air passing through them are presented in small brochure. The improved blast penetration is reported to give decided advantages. Smaller coke can be used without excessive wind box pressures; channeling is prevented; cold core is eliminated; melting rate becomes uniform; less lining destruction takes place; uniform bed height is maintained; and the low, hot melting zone prevents forming slag bridge. *Sprow Tuyere Co.*

330 Cloth dust collectors

Various sizes and models of cloth-tube dust collectors are presented in 36-page Catalog 72-B. Standard assembled and knocked-down models of this equipment have air flow capacities upward from 252 cfm, and filter the air through various kinds of cloth—cotton, wool, or synthetics, depending on the application. Continuous automatic collectors are provided where requirements are such that service must not be interrupted for shaking the filters to release accumulated dust. The description of each type of collector is accompanied by full specifications, drawings, etc. *American Wheelabrator & Equipment Corp.*

foundry tradenews

Hewitt-Robins Inc. will move its headquarters offices from 370 Lexington Ave., New York, to Stamford, Conn., about April 1. The corporation will lease the former Crofoot property in Stamford's Glenbrook section. Alterations are now being made to adapt it to headquarters office use. Divisions of the corporation will remain in their present New York offices.

The Lunkenheimer Co., Cincinnati, held its yearly sales conference in that city January 14-18. This year marks the company's 90th anniversary in business. Of featured importance was the reorganization of sales territories and executive appointments. Effective January 1, the United States was divided into three sales sections—Eastern Div., under Melvin W. Pauly; Central Div., under Harold H. Layritz; and Western Div., under Charles W. Burrage. These men have been named sales managers.

Rockwell Mfg. Co., Pittsburgh, announces the transfer of its Delta Power Tool Sales Div. from Milwaukee to Pittsburgh, in Rockwell's headquarters.

Robinson Clay Product Co., Akron, Ohio, has embarked on an extensive plant expansion and improvement program designed to increase output of refractories products. Building and equipment changes and additions are already being rushed to completion at factories in Ohio and Pennsylvania. Modern pressing, drying, and firing equipment is being added, and improved material handling methods are being applied.

Caterpillar Tractor Co., Peoria, Ill., presented a picture familiar to stockholders all over the country—sales volume up, profits down. According to spokesmen for the company, any improvement in the profit picture will depend upon the extent to which high cost premiums on steel purchases can be eliminated, whether operations can continue without interruption, and the effect of government controls on wage rates and prices.

Smith Power Transmission Co., Cleveland, recently formed the **Flexaid Conveyor Co.** to develop, design, construct, and install conveyor equipment.

Gordon F. Sondraker & Co., 5259 Atlantic Blvd., Maywood, Calif., is a new company formed to deal in foundry supplies and equipment. Included in the lines handled are metal melting aids and handling equipment for die casting and permanent mold operations, Kirksite, and lead foundries. The company was formerly the foundry division of **Dayton & Bakewell,** Los Angeles.

Doehler-Jarvis Corp., Toledo, Ohio, made the following executive appointments effective January 2: H. H. Doehler, honorary chairman of the board of directors; L. A. Jarvis, chairman of the board of directors; F. J. Koegler, president.

American Silica Sand Co., Ottawa, Ill., recently bought a new truck-loading shovel to expedite its operations.

De Laval Steam Turbine Co., Trenton, N. J., has completed installation of Meehanite process controls. Their foundry produces about 25 tons of castings daily for centrifugal and rotary pumps, steam turbines, speed reducers, and blowers.

Howard Foundry, Chicago, purchased a non-ferrous foundry in Indianapolis, Ind., last December. The plant covers 220,000 sq ft, and is currently producing magnesium armament castings for the government. It is the only magnesium sand casting plant in the area.

American Gear & Mfg. Co., Lemont, Ill., a wholly-owned subsidiary of **Brad Foote Gear Works, Inc.,** Chicago, has completed installation of modern heat treating equipment. Machinery is now operating at full capacity. American Gear has an 18-month order backlog.

International Graphite & Electrode Corp., a subsidiary of **Speer Carbon Co.,** St. Marys, Pa., has broken ground to start the construction of new graphitizing facilities for its Niagara Falls plant. Facilities will cover 25 acres and cost $10,000,000. Equipment will include a calciner, 16 graphitizing furnaces, and complete milling, extruding, and baking units. Full production should be under way by May, 1953, although each unit is built to start producing upon individual completion.

International Nickel Co. of Canada, Ltd., Copper Cliff, Ontario, Canada, mined more ore from underground in 1951 than in any year of its history. Production from underground was 7,780,000 tons. Total ore mined was 11,800,000 tons this year.

Cleco Div. of **Reed Roller Bit Co.,** Houston, Texas, announces the appointment of **Arrow Supply Co., Inc.,** Pittsburgh; **Peerless Supply Co.,** Des Moines, Iowa; and **Bates Supply Co.,** Quincy, Mass., as distributors for its products in those areas.

H. Kramer & Co., Chicago, and its **Ajax Metal Div.,** Philadelphia, were the recipients of scrolls of appreciation signed by representatives of eight foreign countries. Under the auspices of the ECA, the representatives toured their plants.

Federated Metals Div., American Smelting & Refining Co., New York, has made three additions to its sales staff. Alfred L. Lee will cover Philadelphia, South Jersey, and Eastern Pennsylvania areas; Edward R. Bergin will cover metropolitan New York; and Alfred Blackstone will handle North Carolina, South Carolina, eastern Georgia, and all but the extreme western part of Florida.

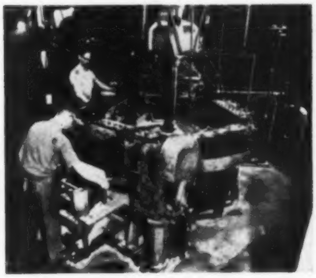
Eduard Bargezi, managing director of Austro-American Magnesite Works, Radenthein, Austria, points out an interesting phase of the Austrian refractories works to Russell P. Heuer, vice-president of General Refractories Co., Philadelphia. Austro-American is a subsidiary of General Refractories Co., and Dr. Bargezi is currently on a business tour of the United States.

Products . . .

continued from page 17

309 Making automotive cores

Production increases of over 600 per cent are being reported by automotive foundries from an automatic method of making cores. Method uses the Roto-Core Automatic, a machine that combines the main jobs of core-making: 1) blowing the core; 2) providing empty boxes and removing



filled boxes; and 3) rolling and drawing the core from filled boxes. Completed cores are deposited on dryer plates, ready for processing. The machine takes a two-man team and can make 360 cores per hour. All important operations are protected by limit or pressure switches. To prevent jarring the cores, the indexer operating from the station before the blow is stopped gently by an oil cushion. Core boxes are mounted on removeable platens for quick change. Entire machine is reported to be extremely simple to operate. *Osborn Manufacturing Co.*

310 All-direction vibrator

Model DV 51 pneumatic vibrator is designed specifically for large bins and hoppers. It delivers a powerful, all-directional vibration without damaging faces to which it is attached. A 2-in. ball weighing one lb is pneumatically driven around a stationary two-rail race to provide the action. *Martin Engineering Co.*

311 Motorized broom

No water, chemicals, or detergents are needed by this one-man scarifying and cleaning machine. Rated at 25 hp, it cuts loose and picks up packed grease, dirt, and metal cuttings at speeds to 11 mph. It cleans a 36-in. path, and has a capacity of 20,000 to 60,000 sq ft per hour. Action is provided by a scarifying cylinder that revolves at 1400 rpm. It has a smoothing action that leaves aisles dry and firm-surfaced. Two types of scarifying cylinders are available. Heavy soilage, such as packed layers of dirt and grease, is cut loose by a wire brush cylinder containing twisted tufts of steel wire. Extra

heavy soilage, such as metal chips, dried paint or varnish, tar, and cement splashes, is pulverized by a cylinder containing tool steel cutters. This cylinder can also be used for scoring concrete before applying new topping. *G. H. Tennant Co.*

312 Single-groove V-belts

Single-groove FHP V-belts feature straight sidewalls for more grip and cords in the strength member held in a straight line by a special ply of woven duck under the top cover. This construction is said to increase life of the belt and the machine it drives by eliminating vibration. *Raybestos-Manhattan, Inc., Manhattan Rubber Div.*

313 Mobile core grinder

Grinding faces uniformly flat to assure accurate pasted joints, mobile foundry core grinder is well suited for production

or jobbing foundries. It handles a large range of core sizes, is sturdy, and is mounted on large casters. The 18-in. grinding wheel is mounted on an adjustable head which locks firmly in any position. Maximum clearance between

table and wheel is 18 in., and maximum working capacity is a 15 x 24-in. core surface. Small cores can be mounted in multiples on gang fixtures to speed production. Operation takes considerably less time than hand filing or scraping, and eliminates broken edges. *Spo Inc.*

314 For grinding castings

Designed for use on right-angle or sander-type portable grinders, the BFR hub-type wheel is made of carded web material impregnated with abrasive grain. It is used to smooth down welds, blend

surfaces on contours, and notch risers in all kinds of castings. Should breakage occur, the web will hold pieces together until the machine can be stopped. *Norton Company.*

315 Belt conveyor idlers

Improved line of belt conveyor idlers features changes in the greasing design. Rigid steel grease piping has been replaced by reinforced flexible grease tubing, which will take higher gun pressures and will not break off in shipment. The flexible sections are made in lengths which allow them to hug the inside of the inverted angle or channel base. Extension to the far side is accomplished by threading a flexible section through base to a grease fitting. *Chain Belt Co.*

foundrymen

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who holds a BS in mechanical engineering from Alabama Polytecnic Institute and an MS in business and engineering administration from MIT, has been employed by Allis-Chalmers since 1937.

Charles L. Hardy, president and director of Joseph T. Ryerson & Son, Inc., Chicago, has undertaken to head up solicitations within the steel and iron group of the 1952 Red Cross Fund campaign's business division. As chairman of the group, Hardy will be responsible for the organization and solicitation of funds from 39,000 employees in 186 firms.

Edgar F. Gore, on loan to the Light Metals Section of the NPA for the past six months, has resumed his duties as sales manager for the Michigan Smelting & Refining Div. of the Bohn Aluminum & Brass Corp., Detroit.

Boyd E. Cass was recently named manager of metallurgical sales for Foote Mineral Co., Philadelphia. Prior to assuming his new position, Mr. Cass served as sales engineer to the metallurgical trade. He has also been affiliated with Baldwin Locomotive Works, Cramp Shipbuilding Co., and U. S. Steel.

▶ *Obituaries*

Raymond C. Gaugler, president of American Cyanamid Co., New York, died early January 11 in Larchmont, N. Y. Cause of death was cerebral hemorrhage. He is survived by his wife, four daughters, and 13 grandchildren, and was 59 years old. Before joining Cyanamid, he was associated with United States Aluminum Co., New Kensington, Pa., and Northern Aluminum Co., Shawinigan Falls, Canada. He had been with Cyanamid since 1917, serving at various times as assistant treasurer and comptroller, treasurer, vice-president in charge of finance, and executive vice-president. His election to the presidency took place in January, 1951.

William Clarkson, president of Oil City Iron Works, Corsicana, Texas, died November 3, 1951.

William L. Dean, president of Mathews Conveyor Co., Ellwood City, Pa., died Wednesday, February 6, in Florida. Mr. Dean had been with the company since 1909. Starting as shipping clerk, he gradually worked into bookkeeping and accounting. He served several years as vice-president and general manager, and in 1948 was elected president of the company.

John H. Bunte died in Chicago January 17. He was director of purchases for Howard Foundry, Chicago, Ill., and had been with the company for 20 years.

index to

Advertisers

employment

■ To contact "Help Wanted" or "Position Wanted" advertisers, write to American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. In replying to "Help Wanted" advertisements, applicants must send outline of background.

Help Wanted

HW 583 . . General foundry foreman

A large aluminum foundry in Michigan has opening for general foundry foreman. Applicant must be experienced in all phases of aluminum sand foundry work, including gating of patterns.

HW 587 . . Metallurgist

Metallurgist with five to ten years experience, laboratory or plant. Immediate work will involve considerable writing. Interesting opportunity at industrial research institute. Location Southwest.

HW 588 . . Estimator

Large jobbing and semi-production gray iron foundry in Middle West needs man experienced in estimating hours for various phases of production. Applicant must be experienced in blueprint reading and have a knowledge of setting standards. Reply in confidence giving full information as to age, background and experience, as well as salary required.

HW 589 . . Foundry Superintendent or Manager

Age 28-40. Engineering graduate preferred, minimum two years college and equivalent experience acceptable. Minimum three years foundry administrative and technical experience required. Large manufacturing concern needs man with above qualifications to manage new foundry western South Carolina. This induction melting foundry produces small daily tonnage of small precise castings ferrous and non-ferrous metals. Excellent opportunity for right man to join established and progressive company. Will have every opportunity to expand present facilities. Salary $5500 to $6500 per year. Give full educational and work background.

Positions Wanted

PW 171 . . Administrative Metallurgist

Metallurgist available for administrative position (gray iron or malleable). Western location preferred.

PW 172 . . Salesman

Salesman with good clientele, 20 years foundry experience, would like good refractory or foundry line. Presently employed.

WANTED
PLANT MANAGER

Experienced in government specification work, for largest non-ferrous foundry in Dallas. Mechanization under way with machinery, capital and buildings available for increased expansion. Unlimited future for right man. Replies confidential.

Write
WAYLAND BOLES
4369 Potomac Dallas 5, Texas

FOR SALE

SLY TUMBLING BARREL—24" diameter x 60" long x ¾" plate Type C Tumbling Mill complete 3 hp TEFC motor with starter.

Good Condition
BOX N-119
American Foundryman 616 S. Michigan
Chicago 5, Illinois

FOR SALE
FOUNDRY — GRAY IRON

With two clear spaces 80 x 320, with overhead monorail attached building 40 x 50. Has two No. 7 Whiting cupolas 72" in diameter. Contains equipment ideal for mechanized operations. Vicinity population about 9,000. Near center of U. S. population. Water transportation available.

BOX N-120
American Foundryman 616 S. Michigan
Chicago 5, Illinois

FOUNDRY METALLURGIST

Excellent opening for metallurgical engineer with interest and knowledge of modern research methods in foundry field. Practical foundry background preferred. Excellent opportunity for personal and professional advancement in expanding organization.

Assistant Director for Personnel
ARMOUR RESEARCH FOUNDATION
ILLINOIS INSTITUTE OF TECHNOLOGY
Chicago 16, Illinois

DEPARTMENT HEADS
STEEL FOUNDRYMEN

Opportunities for department heads in a large steel foundry. Department heads needed in:
Molding Core CF & A
Government-owned defense plant in Chicago area operating on armor steel castings. Company operating setup sufficiently large and aggressive to afford permanent opportunity to men whose performance proves outstanding.

N-121
American Foundryman 616 S. Michigan
Chicago 5, Illinois

WANTED

100-250 KW H.F. Induction Furnace
Write full details to:
Box 2188
University, Alabama

SALESMAN WANTED
Sand Castings—Brass—Bronze—Aluminum

Only experienced man with contacts need apply.

HALL FOUNDRIES
Executive Offices: 100 West 52nd St., N. Y. C.
Telephone CIrcle 7-1675
Foundry: Bridgeton, N. J. Telephone 9-1091.

Classified and Employment Ad Rates

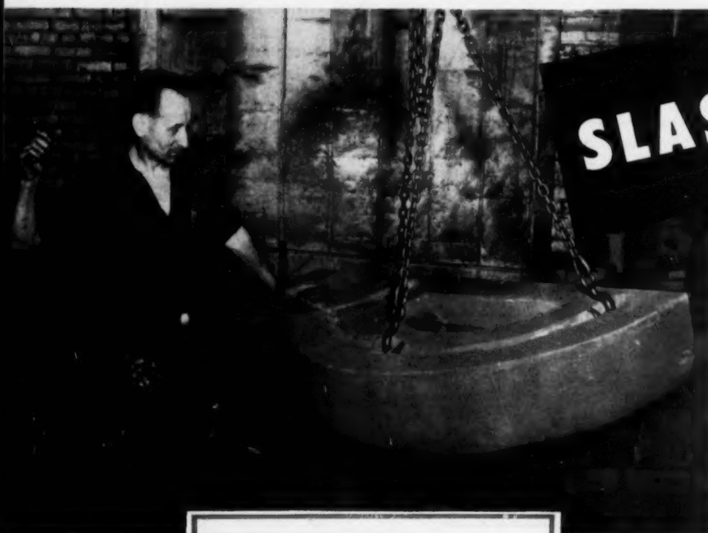
- **Classified ads**—$10 per column inch
- **Employment Service**—"Position Wanted" ads $5. "Help Wanted" ads $10.
- **Professional Cards**—$10.

American Foundryman
616 S. Michigan Chicago 5, Ill.

▶ Professional Services

INDUCTOL

the "pre-baked" core oil



SLASHES BAKING

1 ***Steam end core for turbine casing.*** This core now bakes overnight—12 hours at 420°. Before using INDUCTOL, 24 hours (two nights), were required. Elmer Maving, core boss, looking on.

2 ***Close-up diaphragm core for steam turbine,*** showing stainless steel blades inserted.

3 ***Slicking the core surface.*** No stickiness developed by using INDUCTOL.

ASK YOUR LINOIL MAN ABOUT

INDUCTOL

Write today for your copy of Bulletin No. 108. It tells the whole Inductol story—every core boss should read it.